NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

AN INTERNATIONAL DATA GROUP PUBLICATION ♦ VOLUME 11, NUMBER 6 ♦ FEBRUARY 7, 1994

DEC mgmt. migration plan to feature coexistence, discounts

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. this week will answer critics of its plan to migrate customers to a new net management platform by offering steep discounts on the new product as well as tools that provide peaceful coexistence with the old.

DEC will offer its new Polycenter NetView platform, which is based on IBM's NetView/6000, at up to 90% off list price to users of its existing Polycenter Framework product that have DEC service contracts. In addition, the company will announce software to help users make a gradual shift from Polycenter Framework by letting them use it along with Polycenter NetView while they get comfortable with the new platform and DEC outfits it with more DECnet management capabilities.

DEC is hoping to quell user anxiety prompted by the phaseout of Polycenter Framework and its replacement with Polycenter NetView. Users have expressed concerns about the time and expense involved in migrating to Polycenter NetView and in

See **Migration**, *page 53*

Cabletron entry fleshes out high-end hub lineup

BY SKIP MACASKILL AND JOANIE WEXLER

Newton, Mass.

Cabletron Systems, Inc. last week became the last of the Big Three hub vendors to detail its next-generation hub, giving users and analysts their first opportunity to assess the trade-offs of the vendors' schemes for handling exploding bandwidth requirements.

Analysis

Cabletron is betting that the new distributed architecture of its MMAC-Plus hub — scheduled to ship in May — will give it an edge in the high-end hub market. The architecture eliminates the need for dedicated management and internetworking modules, and allows users to seamlessly interconnect packet- and cell-based networks.

With its single-bus switching design, the MMAC-Plus stands apart from devices that use multiple internal data highways for different functions because of its inherent inter-LAN connectivity, observers said. For exploding bandwidth needs, "switching is the key factor, and it is more cleanly implemented here than in offerings from SynOptics

See **Hub analysis**, *page 54*

SynOptics will target LAN-to-ATM migration with EtherCell device. *Page 6.*

NetWare 4 off to slow start

BY CARYN GILLOOLY

Provo, Utah

Almost a year after its introduction, NetWare 4 is struggling to live up to its advance billing.

Many users are finding that the Novell, Inc. software doesn't add enough value to NetWare 3 to make an immediate switch worthwhile. Even though some customers are moving to NetWare 4 to take advantage of its advanced directory services and other new functions, resellers said lengthy sales cycles coupled with complex upgrades have made for a slow transition.

Some Novell Platinum resellers said they have sold only a handful of red NetWare 4 boxes, quietly admitting they are not recommending NetWare 4 to even their largest customers. And financial analysts have lowered their once optimistic revenue projections.

The technical reasons for the slow adoption of NetWare 4, such as a lack of tools to help NetWare 3.X and 4.X servers coexist, have been brought to light and are expected to be eliminated when NetWare 4.1 is released around May.

But the bigger issue, one Novell cannot easily solve with a new release, is that many customers just don't need NetWare 4 now.

When Novell released NetWare 386 in 1989, cus-

See **NetWare**, *page 55*

Ray Noorda -voir

Who should take over when Ray Noorda steps down at Novell, Inc.? Customers, rivals and other pundits speak out. Page 20.

Oracle to sculpt an alternative to Notes

Multimedia groupware set for '94 debut.

BY PETER LISKER

Redwood Shores, Calif.

Oracle Corp. is readying a full-fledged competitor to Lotus Development Corp.'s Notes groupware that will incorporate Oracle's core database technology.

Oracle Chief Executive Officer Larry Ellison said during an exclusive briefing here that the company will introduce a client/server-based product called Oracle Documents in the second half of the year. The software will go beyond existing groupware products to handle not only documents, but also audio, video and SQL-based data, he added.

What we're doing is bringing the full range of information into the traditional structured [database] environment.

"What we're really doing is bringing the full range of information into the traditional structured environment associated with a [relational DBMS]," he said.

Oracle Documents will incorporate Notes-like capabilities, such as document replication, and will be "a true Notes competitor," Ellison said.

The product will ship on Unix-based servers running Oracle7. Ellison did not say whether the product will work with other vendors' databases or even with Notes. Oracle Documents will support Microsoft Windows clients initially, as well as other popular client operating environments that will be named later.

Oracle Documents is designed to improve on Oracle Office, the company's current groupware offering. Oracle

See **Oracle**, *page 54*

Utah heads down frame relay road to the future

BY BILL BURCH

Salt Lake City

Utah is counting on frame relay to help pull state government into the future.

As a big first step toward its goal of building an all-encompassing digital highway, the state is migrating its Systems Network Architecture network to an efficient 12,000-node, frame relay-based LAN internetwork that will carry all government data traffic.

The multimillion-dollar project is about half finished, with roughly 6,000 end-user machines and 90 routers on-line.

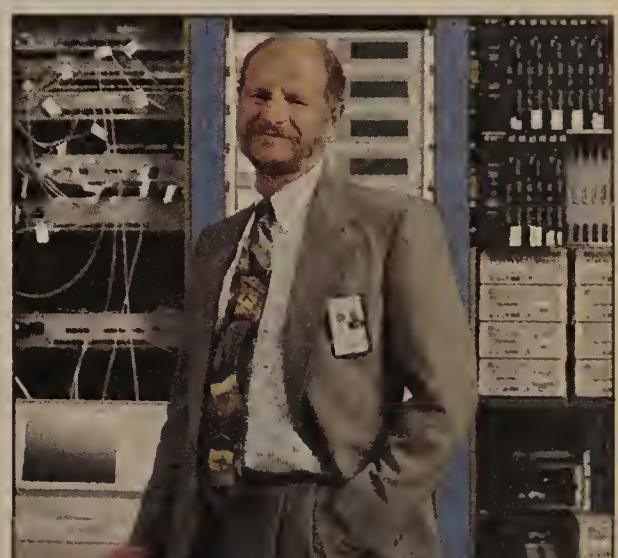
But state agencies are already benefiting from wider connectivity, more available bandwidth for new applications and improved performance, said Russ Fairless, the state's network services manager. For example, response time on the old SNA net that averaged four seconds is down to less than one second on the frame relay net.

"And we're adding much more functionality by being able to connect all of the different LANs together into pretty much a mesh network," Fairless said.

Before the switch to frame relay, the state's SNA network was a vintage multidrop setup. At its peak four years ago, the network connected 8,000 terminals to the state's mainframe via 9.6K and 19.2K bit/sec lines.

Now the state is migrating to a series

See **Utah**, *page 54*



TED BOUCHER

Russ Fairless mans Utah's network center.

Briefs

Taking the wireless shuttle. Network users will now be able to fly between buildings — sort of. Windata, Inc. last week announced two wireless systems that will allow Ethernet users in buildings nearly two miles apart to communicate at speeds up to 16M bit/sec via spread-spectrum radio technology. The AirPort Wireless Interbuilding System, which includes a wireless hub, antenna and remote receiver/transmitter, comes in two versions. AirPort I offers line-of-sight connectivity between buildings up to 1,000 feet apart, while AirPort II extends that length to 1.8 miles. Available now, the systems cost $12,450 and $22,000, respectively.

Windata: (508) 393-3330.

Oh, Canada! The Information Superhighway won't end at the northern border. CANARIE, Inc. last week issued a request for proposal, asking for bidders to upgrade CA*Net, Canada's version of the Internet backbone. CANARIE is an Ontario-based nonprofit corporation to which the Canadian government allocated funds to help chart the course for Canada's version of the Information Superhighway. The RFP indicates that only Canadian companies are eligible for funding. Bids are due Feb. 22 with awards expected by March 18.

Securing a $160 million LAN. The Social Security Administration (SSA) last week said it has retirement plans for its existing network. The government agency plans to release a request for proposal for a seven-year, $160 million workstation and local-area network contract by April. The SSA RFP will call for more than 51,000 workstations, 2,500 notebook computers, 1,575 token-ring LANs, plus multiplexers and network management equipment. The SSA plans to link its 1,300 local offices nationwide into a LAN internet.

NTI snaps up Kodak contract. Northern Telecom, Inc. (NTI) last week said it will assume a piece of one of the most widely documented outsourcing arrangements ever, taking over management responsibilities of Eastman Kodak Co.'s 45,000-user internal voice network from Digital Equipment Corp. DEC will retain responsibility for Kodak's domestic data, video and radio networks, and will provide network management services jointly with NTI.

Staying home from work. The Massachusetts state government last week joined forces with 23 companies doing business in the Bay State to push telecommuting as a way to save both money and the environment. Governor William Weld unveiled a one-year Telecommuting Initiative under which 50 state workers and 350 employees from 23 companies will be assigned to work from home. The businesses will provide the technology necessary, and the state will provide educational workshops for employers and employees.

Bell bill bows. Sen. Ernest Hollings (D-S.C.) last week introduced a bill that, like the Brooks-Dingell bill in the House, would allow the regional Bell holding companies inter-local access and transport area long distance. The kicker is that the phone companies would first need to show they face "actual and demonstrable competition" in their local markets.

Eliminating bureaucracy. While sifting through 4,000 pages of a government document can provide endless hours of fun, IBM has decided there has to be a better way. Big Blue this week announced the Health Care Reform Bookshelf, a set of electronic books on computer diskette that contain the text of Clinton's proposed health care legislation, as well as five competing bills and other related documents. IBM used its Book Manager software to convert over 4,000 pages of documentation into an electronic bookshelf. The product is currently available for downloading through public nets or in a five-diskette set.

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at speeds up to 9.6K bit/sec by dialing (508) 620-1178 or (508) 620-1160. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Dana Thorat via any of the above means.

Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.*

We are looking for cost-effective solutions for connecting our Novell, Inc. NetWare 3.11 users at a branch office in Phoenix to our NetWare 3.11 network at our New York headquarters. We also have a few sales people and customers at remote locations who need to dial in to the New York server to run database applications. I am looking for solutions other than remote control, which is too slow and would add the overhead costs of phone lines in New York and Phoenix for every user.

Dinesh Gulati, E. Setauket, N.Y.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day-per-week NetWare technical support company in Lake Oswego, Ore., replies:

You may find a combination of cost-effective solutions to your problem. For your sales people and customers who call in from remote locations, I would recommend a dial-up solution using a remote access product. This solution offers the best security and keeps the programs and data on the network. Two good remote access products are Symantec Corp.'s Norton pcAnywhere and Microcom, Inc.'s Carbon Copy for Windows. For more product information, call Symantec at (800) 441-7234 and Microcom at (800) 822-8224.

For more information on remote LAN access products, see *NW's* Buyer's Guide, page 43, in the Oct. 25, 1993, issue.

For those users operating for longer periods of time from fixed locations, you might want to consider a dedicated line between your two locations. Also, you may want to use a T-1 line; if that is too costly, a fractional T-1 circuit will do. For the best performance on the dedicated line, I recommend running your applications locally and only going across the wide-area circuit to access data.

See **Help desk,** *page 52*

CONTENTS

NEXT WEEK:

Is client/server computing really catching on? Find out what other users think about the technology, based on results of a survey cosponsored by *Network World*.

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ENTERPRISE SERVICES

Banyan outlines plans for unbundling services

BY CHRISTINE BURNS

Westborough, Mass.

Banyan Systems, Inc. plans to break up its Enterprise Networking Services (ENS) package and sell its Intelligent Messaging and network management components as separate products along with a new mobile computing facility.

In addition, Banyan plans to upgrade the services to run on many popular network and desktop operating systems. And the Intelligent Messaging component will be outfitted with support for industry standard application program interfaces that enable it to work with other leading electronic mail packages.

JOHNSON

"We will keep our integrated [ENS] products, but we also want to create individual services that can be sold into any existing network," commented Bill Johnson, vice president for product marketing at Banyan.

The plan should make the ENS products less expensive and easier to deploy while simultaneously helping Banyan expand its product line beyond the NOS arena where it was previously unable to garner a large market share.

By becoming a services broker with products running across platforms, Banyan will be able to "grab a bigger piece of a much bigger pie," said Stan Schatt, LAN service director at Computer Intelligence InfoCorp, a research firm based in La Jolla, Calif.

THE NEW MESSAGE

Intelligent Messaging will be the first ENS component to be unbundled. The product includes both a back-end message routing and storage facility as well as a front-end electronic mail client, yet also works with third-party clients.

Banyan this summer will deliver a new version, code-named Quantum, that lays the foundation for operation across virtually any operating system.

Today, ENS only runs on NetWare LANs, Hewlett-Packard Co.'s HP-UX as well as Santa Cruz Operation, Inc.'s SCO Unix machines.

Like the net management service, Quantum will ship with Banyan's StreetTalk III global directory service.

In VINES and ENS, StreetTalk is tightly integrated with both services.

Quantum will deliver on Banyan's promise to support Microsoft Corp.'s Mail API. Support for other APIs, including Novell, Inc.'s Message Handling System (MHS), Lotus Development Corp.'s Vendor Independent Messaging and Apple Computer, Inc.'s Open Collaborative Environment, is planned for a subsequent release.

OFFERING INTEROPERABILITY

Banyan's plan is not to compete with Novell, Microsoft, Lotus and Apple messaging products but to offer interoperability between them, Johnson said.

"They've all started from more of a work group perspective on messaging, but we're going the enterprise route, making sure the different application suites can cleanly interoperate within a single system," he said.

Quantum is in its final stage of development and will be available sometime this summer, after which Banyan will begin the new packaging structure.

David Ferris, president of Ferris Networks, a consulting firm in San Francisco, said Intelligent Messaging already has a leg up on similar products, such as Novell's Global MHS and Microsoft's EMS, and the new API support will give it even more advantages.

Steve Brown, director of networking operations at ComputerLand Corp. in Pleasanton, Calif., said his company will have Novell's Global MHS installed throughout its headquarters by the end of this month.

Brown is interested in connectivity with Microsoft Mail because his company recently contracted with Microsoft to distribute its products worldwide.

"I'll take a look at Banyan to see what they have, but I'm skeptical about anybody offering that connectivity. It's an extremely tall order," Brown said.

Banyan's new mobile computing service, meanwhile, will support messaging and management services for all types of mobile devices, Johnson said.

He would not provide further details, saying the product is in a very early development stage.

He likewise declined to detail any enhancements that may be on tap for the management component, although company officials in the past have said it will support Simple Network Management Protocol 2.

✆Banyan: (508) 898-1000.

Comments?

See "Contacts" box on page 2.

The cost of E-mail

Company	Product	Annual cost of ownership
Banyan Systems, Inc.	Intelligent Messaging	$99,000
Microsoft Corp.	Microsoft Mail	$176,580
Lotus Development Corp.	cc:Mail	$219,000
WordPerfect Corp.	WordPerfect Office 3.1*	$231,240

Based on a survey of 143 companies with E-mail nets supporting roughly 1,100 to 2,000 users and 16 to 31 E-mail servers.

*Product has since been revamped as WordPerfect Office 4.0.

SOURCE: INFOCORP, WESTBOROUGH, MASS.

Database vendors embrace SNMP

BY PETER LISKER

Fremont, Calif.

Twelve leading database vendors have formed a working group to develop specifications that will let Simple Network Management Protocol-based platforms manage distributed databases.

The working group has been chartered to define an Internet SNMP Management Information Base (MIB) draft by March that will allow network managers to track database availability, performance, configuration information and other data using the SNMP 2 protocol. Among the vendors working on the MIB are IBM, Digital Equipment Corp., Informix Software, Inc. and Oracle Corp.

The lack of an industrywide standard for reporting such information has been a problem for users faced with integrating a range of disparate database systems and an impediment to the deployment of distributed databases on an enterprise level.

SNMP 2 will allow more interactive communication between management systems and agents than SNMP, resulting in more sophisticated management applications. Vendors, including , Hewlett-Packard Co., DEC and IBM, have announced their intention to support SNMP 2 in their management wares, as have many hardware vendors.

"SNMP is really a surprisingly broad-based standard for reporting system status that can be applied to software systems," said Marshall Rose, principal at Dover Beach, Inc., a Mountain View, Calif.-based consulting firm.

SNMP goes after databases

With a new database MIB, SNMP platforms will gather data about:

- Database status
- Transaction activity
- Response time
- Configuration

MIB working group:

- The ASK Group, Inc.
- Borland International, Inc.
- Digital Equipment Corp.
- Gupta Corp.
- IBM
- Independence Technologies, Inc.
- Informix Software, Inc.
- Oracle Corp.
- Progress Software, Inc.
- Red Brick Systems, Inc.
- Sybase, Inc.
- Tandem Computers, Inc.

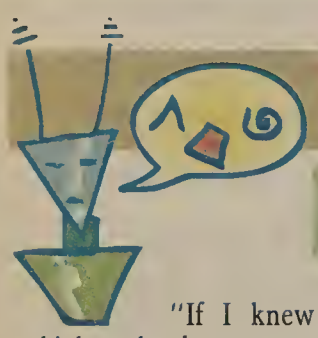
The goal of the working group will be to provide database vendors and third-party companies with specifications they need to write SNMP agent software that supports various functions.

For example, a database system supporting the new MIB should be able to return information identifying itself, the database vendor and some fundamental parameters relating to system availability and activity levels. This data could be gathered by the same SNMP-based platforms users have in place to manage devices such as routers and hubs.

"The database arena is ripe for a standards-based platform that will allow a more comprehensive [management] system to be implemented that really deals with the reality of today's mixed data processing world," said Al Simila, manager of systems integration for Pacific Gas & Electric in San Francisco.

Although most vendors do not expect to produce products based on the new MIB until the draft is final, some are pushing ahead prior to that. For example, Gupta Corp. officials said work is already under way to build support for the MIB into their database management tool, SQL Console.

But Richard Finkelstein, president of Chicago-based consulting firm Perfomance Computing, Inc., sounded a cautionary note. "It really is just a smoke screen to cover up fundamental problems that the vendors have in the interoperability environment," he said. "I don't expect that their effort will deliver any comprehensive capabilities that will let network managers do end-to-end management of systems, but at least the database companies are realizing the seriousness of their users' concerns."



CyberSpeak: *Voices from the reader network*

Which technology — ATM, SMDS or frame relay — do you think will win the high-speed services battle? Why?

"If I knew the answer to which technology was going to win out, Icertainly wouldn't be in this job. We're looking to implement frame relay because it's here and has a reasonable price. But the reality is that carriers are working as fast as they can on ATM. So even if they're giving me frame relay, once I'm into their network, I'll probably get some of the benefits of ATM. [ATM services themselves are] too expensive for our taste right now."

Steve Brown, director of networking operations, ComputerLand Corp., Pleasanton, Calif.

"ATM will win the high-speed services battle, although it is clear that ATM will not become widely available for a few years. While users wait for ATM to become a reality, [Switched Multimegabit Data Services] and frame relay will continue to be used, with frame relay continuing to dominate, thanks to better pricing and higher availability. Because of SMDS' lack of interexchange availability and hardware incompatibility, SMDS will continue to be the laggard."

Mark St. Pierre, senior software engineer, GeoTel Communications Corp., Littleton, Mass.

"Network planners have long dreamed of a single, ubiquitous high-speed network capable of transporting voice data, video and image on a single network. ATM, with its flexible cell-by-cell multiplexing, is today's odds-on favorite to achieve this dream. More than a dozen chip vendors are already in full-scale production or sampling of a range of ATM integrated circuits, and more than 350 firms are participating in the ATM Forum."

Bob Rosenberg, president, Insight Research Corp., Livingston, N.J.

NextWeek CyberSpeak Out!

Does your company plan to migrate to NetWare 4? Why or why not?

Responses must be registered by 5 p.m. on Thursday, Feb. 10. CyberSpeak T-shirts will be awarded to those whose responses are printed (please include mailing address).

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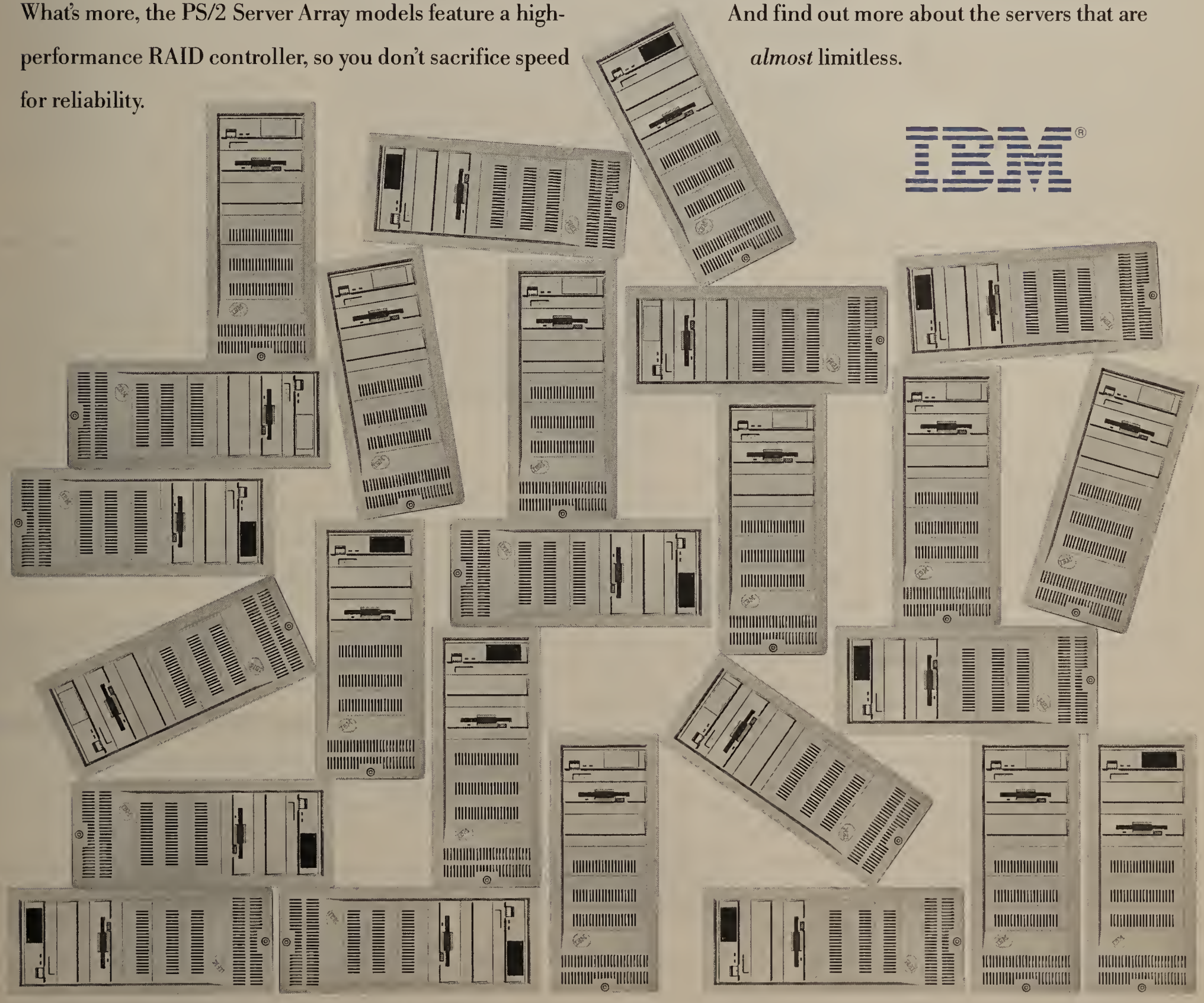


*Please call for model availability. **Available from IBM, M–F, 8 A.M.–5 P.M. in your time zone. Copies of IBM's statement of limited warranty are available upon request, by calling 1 800 772-2227. IBM and PS/2 are registered trademarks and SynchroStream is a trademark of International Business Machines Corporation. Pentium is a trademark of Intel Corporation. © 1993 IBM Corp.

SynOptics provides key piece of LAN-to-ATM puzzle

New switch provides packet-to-cell conversion.

BY SKIP MACASKILL

Santa Clara, Calif.

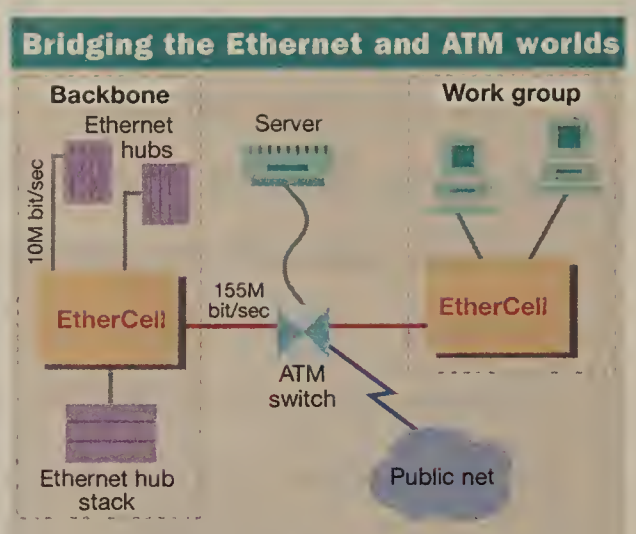
SynOptics Communications, Inc. this week will span the gap between the Ethernet and Asynchronous Transfer Mode (ATM) realms with the introduction of its stand-alone EtherCell switch.

The packet-to-cell conversion device also functions as an Ethernet switch, providing dedicated 10M bit/sec links to the desktop or between several Ethernet segments. It will also allow net managers to create virtual nets spanning Ethernet and ATM segments.

EtherCell, which by year end will be offered in modular form for SynOptics' LattisSystem 5000 and 3000 hubs, will end speculation of how SynOptics will tie its family of hub products and its LattisCell stand-alone ATM switch.

"The lack of an ATM migration path has hurt SynOptics," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston. "EtherCell should have been announced six months ago, but it will be attractive to users because they don't have to ditch their installed base to get to ATM."

EtherCell will accept Ethernet traffic via 12 10Base-T ports, convert it to 53-byte ATM cells and send it over the ATM port at 155M bit/sec. The port will support fiber-optic or Category 5 unshielded twisted-pair wiring, providing a way to link Ethernet users to high-performance backbones, server clusters or ATM-based public net services.



SynOptics' EtherCell can be deployed as a backbone switching hub, providing Ethernet hubs with access to ATM services, or as a work group switch that offers ATM access and dedicated Ethernet links between devices.

SOURCE: SYNOPTICS COMMUNICATIONS, INC., SANTA CLARA, CALIF.
GRAPHIC BY SUSAN SLATER

"EtherCell can reduce network bottlenecks by allowing several Ethernet users to simultaneously access a server via the ATM link," said Bert Williams, product marketing manager at SynOptics. "With its virtual LAN capabilities, which allow users to be grouped together in software-defined networks, EtherCell also allows managers to give selective access to net resources centrally located on an ATM network."

SynOptics' approach to the LAN-to-ATM dilemma is in direct contrast to its chief rival. Cabletron Systems, Inc. this week will unveil its next-generation hub that can accept traffic from any type of local-area network and convert it into cells via software right on the interface modules (see story, page 1.)

With Cabletron's new MMAC-Plus hub, no stand-alone device or dedicated hub module is required.

"With Cabletron's approach, you don't pay the penalty of using up a hub slot or buying an external device, but we won't know if it really works until it's delivered," Robbins said.

The stand-alone version of the switch may better fit a stackable hub environment, said Valentin Sribar, senior research analyst at META Group, a consultancy in Westport, Conn.

"By placing an EtherCell on the top of a hub stack, users can get switching and ATM uplink features in a form factor and price point that makes more sense than sticking a chassis-based hub into the wiring closet," Sribar said.

EtherCell with the fiber-based ATM port will be available in April and cost $9,995, while the copper version is expected to follow in June when the ATM Forum specification for a Category 5 unshielded twisted-pair ATM interface is scheduled to be finalized. It will cost $9,495.

©SynOptics: (408) 988-2400.

Novell details more AppWare

BY CARYN GILLOOLY

As a follow-on to its recent AppWare road tour, Novell, Inc. has provided more details about features and delivery dates for its AppWare Foundation.

The AppWare Foundation, to be released in May, is a third-generation language application development tool with a common application program interface (API) designed to provide application portability across different platforms.

At a recent AppWare developers meeting Novell provided specifics on how it will make applications service- and platform-independent.

Willie Tejada, director of marketing for Novell's AppWare Systems Group, discussed plans for Universal Directory Services (UDS), "an API that is hospitable to multiple directory services." According to Tejada, programs written to the UDS API will be able to interact with a variety of directory services.

Novell itself will support the API in its NetWare Directory Service and NetWare Bindery directories, as well as in the Unix Domain Name Service directory. The company is expected to release the first review specification of these APIs at its BrainShare developers' conference in March.

Through what the firm calls the Component Service Interface (CSI), Novell plans to let other vendors create APIs to provide access to their directories through the AppWare Foundation.

Executives also said Universal Named Pipes, Universal Messaging and Universal Compound Document APIs are currently under development. Ultimately, these additions will ensure that applications developed under the Foundation will be transport-, electronic mail- and document format-independent. Further details about these APIs were not available.

On the platform side, the Foundation will initially support UnixWare, Apple Computer, Inc.'s Macintosh, Hewlett-Packard Co.'s HP-UX, Microsoft Corp.'s Windows and Sun Microsystems, Inc.'s SUNOS environments.

In March, the company plans to release developer versions of the Foundation for OS/2, Solaris SPARC and Digital Equipment Corp.'s Alpha OSF1 environments.

General release of the SPARC version is expected in the same quarter, while general release of the Alpha OSF1 version is expected in the third quarter and the OS/2 version is expected in the fourth quarter.

Novell said it is currently developing Foundation support for Windows and Apple PowerPC MacOS environments.

US West hardens network against nuclear blast

BY BILL BURCH

High above Colorado, a nuclear bomb detonates in a blinding flash, and the electromagnetic pulse it generates sends millions of volts surging through the area's electrical grid, fusing contacts shut, frying chips and wreaking havoc on the defense and industrial infrastructure. Talk about a power surge.

To avert such a crisis, US West, Inc. will be supplying the U.S. Air Force with surge-protected T-3 circuits. Under the Strangelovian name of HEMP-45, which stands for high-altitude electromagnetic pulse-protected, the service will provide hardened connections for the data center that cannot afford to shut down for nuclear winter.

Under a tariff that takes effect later this month, US West will connect the Cheyenne Mountain missile warning and air defense centers to Peterson Field and Falcon Air Force Base. The network will use surge-proof fiber-optic lines configured in a triangle between the three installations.

To protect from a blast, HEMP-45 will not use repeaters, which can be damaged by an electromagnetic pulse. Instead, the service will rely on straight fiber to connect the three sites.

The interest in hardening military electronics against electromagnetic pulse started in the '60s, said Bill Burr, an analyst for the National Security Archives. Security analysts say the former Soviet Union could cripple a quarter of U.S. military sites by disabling electrical systems with nuclear blasts.

FCC decisions to spur regional wireless services

BY DAVID ROHDE AND JOANIE WEXLER

Washington, D.C.

The Federal Communications Commission signed off on its allocation plan for narrowband personal communications services (PCS) last week with the addition of a regional component to its local and nationwide coverage options.

Ultimately, the commission's actions should give companies with growing populations of mobile users access to cheaper and more ubiquitous service for low-speed communications traffic compared with using wideband PCS spectrum, analysts said.

The 900-MHz-range narrowband PCS will likely cost less than wideband PCS, which will run in the 2-GHz range, because "there are some propagation advantages at these speeds that make it easier and cheaper to link pagers, [personal digital assistants] and other devices," said David Coursey, a consultant and editor of the *PC Letter* newsletter in San Mateo, Calif.

The FCC split the country into five large regions that span multiple cities as potential PCS serving areas. It deliberately drew the lines to give each region roughly one-fifth of the nation's population to accommodate wireless entrepreneurs' requests that service areas extend beyond one city's metropolitan area.

The agency had previously planned to provide licenses only on a local and nationwide basis.

"A major selling point [of wireless services] is the...reach of the service," said Tom Stanley, chief engineer in the FCC's Office of Engineering and Technology.

Narrowband PCS will be allocated in up to 50-KHz chunks. The technology will accommodate low-speed data communications, including one- and two-way paging, simple electronic mail and voice messaging.

"I suspect narrowband would be used more by smaller companies," said Phil Evans, director of telecommunications at Perot Systems, Inc. in Dallas. The reason, he said, is that narrowband's limited bandwidth will not accommodate database access and sophisticated E-mail applications.

However, FCC officials did not rule out other uses.

"If someone can squeeze a quality voice service into the bandwidth, that's fine with us," Stanley said.

Meanwhile, the FCC gave Mobile Telecommunications Technologies Corp., owner of the thriving SkyTel paging net, the pioneer's preference award for a nationwide PCS license while denying applications from four other applicants. SkyTel was unavailable for comment at press time as to how it would use the spectrum.

The first public narrowband service is expected in 18 months. Next month, the FCC is expected to set up a schedule for narrowband PCS auctions, which will let other service providers into the market.

CORRECTIONS

The phone number for Source-Comm Corp. of Valencia, Calif., was inadvertently omitted from a story last week about the company's new router. The number is (805) 294-0550.

The Jan. 24 Network Help Desk incorrectly identified the Ohm impedance of RG-58/U 75 cable used in thin Ethernet. The correct value is 50 Ohms.

In a story last week, it was reported that Pacific Access communications and Key emerging Technology Services, Inc., a new long-distance Switched Multimegabit Data Service carrier, has $100,000 of funding. The firm last week clarified that development funding is "in the six figures."

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IBM unwraps systems manager for CICS sites

BY JIM DUFFY

White Plains, N.Y.

IBM last week unveiled a systems management product for CICS transaction processing environments that resulted from a three-year-old development arrangement with Boole & Babbage, Inc.

CICSPlex System Manager/ESA runs on MVS mainframes in Systems Network Architecture nets. It allows users manage an enterprisewide collection of CICS/ESA and CICS/MVS transaction processing systems and resources from a 3270 terminal.

Using Boole's technology, CICSPlex provides users with a "single-system image" of multiple CICS systems, making CICS processing regions appear as a single CICS system.

CICSPlex is a work load management package that automatically determines the best system for each transaction and then routes the transaction to that system.

Dynamic routing is performed without human intervention through user-defined rules programmed into the CICSPlex system, said Jim Gideon, senior program administrator for transaction processing systems.

CICSPlex also includes a feature called real-time analysis that monitors the performance of CICS systems. When performance crosses a predefined threshold, the analysis feature makes it possible to issue an alert to IBM's NetView management system, Gideon said.

Boole also contributed its Boole & Babbage Intercommunication Facility-3 (BBI-3) middleware to CICSPlex. Applications written to BBI-3 gain a user interface, data modeling, communications and directory facilities, and hardware platform portability.

Through the integration of these components, BBI-3 can provide a single-system image of the managed environment. The feature also gives users a single point of control over their CICS regions. Users can issue a single command from a 3270 terminal that will propagate throughout CICS regions.

Fred Joy, a senior research analyst at META Group in Westport, Conn., said CICSPlex reflects a trend toward consolidating on-line transaction processing management onto single platforms or single products. "This, combined with Boole's close working relationship with IBM, puts [CICSPlex] in an excellent position in this market."

Boole and IBM announced in January 1991 that they would team to develop CICS performance management products that use BBI-3. CICSPlex is the first such product, with more to follow. IBM said it will expand CICSPlex to work with multiple platforms. Upcoming versions will provide an OS/2 graphical user interface and enhanced interaction with NetView, such as support for the RODM database, Gideon said. The system will also manage work loads on CICS OS/2 and CICS/VSE platforms in the future.

IBM will also develop an application program interface for CICSPlex that will allow users to customize the product for their own environments.

CICSPlex carries a monthly license charge of $500 per processor and a monthly charge of $110 per CICS region. The product will be available in March.

✆IBM: (914) 642-3000.

Octel buys out rival voice mail company

BY DAVID ROHDE

Milpitas, Calif.

Looking to move more quickly into PC- and LAN-based voice processing, Octel Communications Corp. last week announced the purchase of VMX, Inc., a rival voice mail firm based in nearby San Jose.

Octel — the leading independent voice messaging vendor — is keen on VMXmail, a voice messaging system built to work with electronic mail systems like Lotus Development Corp.'s cc:mail and Microsoft Corp.'s Microsoft Mail on a local-area network. VMXmail offers screen notification that allows users to visually display the headers of their voice messages and click on the ones they want to hear.

Octel has only a demonstration product of screen-based messaging capability, said Don Van Doren, president of Vanguard Communications Corp., a consultancy in Morris Plains, N.J.

"We have both been striving to do that," Octel Chief Executive Officer Bob Cohn told *Network World*. "They just got there first."

See Octel, *page 53*

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☐ evaluate/recommend suppliers
☐ authorize purchase
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NW 2-94

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CLIENT/SERVER SOFTWARE

LEGENT downsizes software distribution pack

BY MICHAEL COONEY

Herndon, Va.

LEGENT Corp. last week rolled out a new product designed to automate software distribution from Unix servers to a variety of clients across the enterprise.

The firm's DistribuLink-Unix software — like LEGENT's existing mainframe-based software distribution offering — promises to give users improved control over and confirmation of electronically delivered software updates. By doing so, it will eliminate the tedious "sneakernet" approach to software distribution.

DistribuLink-Unix runs on Hewlett-Packard Co. HP 9000 or IBM RISC System/6000 servers and can distribute software over Transmission Control Protocol/Internet Protocol or asynchronous links to HP-UX, AIX/6000, The Santa Cruz Operation, Inc.'s SCO Unix, Sun Microsystems, Inc.'s OS, Windows, OS/2 and DOS clients. LEGENT also promised support by April for servers running most of these operating systems.

"We are offering users a software distribution solution they can run from a centrally located workstation, rather than a mainframe,

See LEGENT, *page 53*

Tivoli Systems broadens its mgmt. horizons

BY JIM DUFFY

Austin, Texas

Tivoli Systems, Inc. last week announced enhancements to its systems management and software distribution products that bring them beyond just the Unix environment.

The company's products will be enhanced to let managers support more components — including Novell, Inc. NetWare local-area networks — across the enterprise.

Tivoli's systems management platform, called the Tivoli Management Environment (TME), currently allows users to track the performance and configuration of Unix systems distributed across a corporate network. It allows managers to more easily add users, install network file systems and distribute software across the enterprise.

Analysts said Tivoli's enhancements will keep the company competitive with old guard systems management vendors such as Hewlett-Packard Co. and IBM, as well as aggressive newcomers, such as OpenVision.

"That whole systems management business is really going to take off," said John McConnell, president of McConnell Consulting, Inc. of Boulder, Colo. "Job scheduling and all that kind of stuff are certainly the right things to add to their mix."

In addition to adding support for NetWare servers, Tivoli will support DOS, Windows and Windows NT clients and servers via its management agent software and software distribution product.

The TME Agent is event-driven code that will reside on NetWare, DOS, Windows and Windows NT systems, allowing them to be managed from a TME console. The agent is designed to send alerts to the console when significant events occur and receive management commands from that console via an object-oriented request broker.

Tivoli/Courier is an electronic software distribution package that automatically updates software releases on systems where the TME Agent resides. A new release of Tivoli/Courier, Version 1.8, will support NetWare servers as well as computers running DOS, Windows and Windows NT platforms. Previously, it only supported Unix systems.

TME Agent software costs $100 and will be available for NetWare in March, and for DOS, Windows and Windows NT systems in the third quarter. Tivoli/Courier 1.8 will start at $2,600. It will be available for NetWare systems in March and for DOS, Windows and Windows NT systems in the third quarter.

Tivoli also announced technology integration alliances with Epoch Systems, Inc. of Westborough, Mass., and AutoSystems Corp. of Boulder, Colo. Under the technology unions, the Epoch and AutoSystems software will run on the TME platform. Tivoli will offer these packages under its own label as Tivoli/Epoch-Backup and Tivoli/Workload, respectively.

Tivoli/EpochBackup will cost $995 for a single node and $140 per node in 50-node networks. It will be available in the third quarter. Tivoli/Workload will cost from $500 to $9,500, depending on the processor, and it will be available by April.

✆Tivoli: (512) 794-9070.

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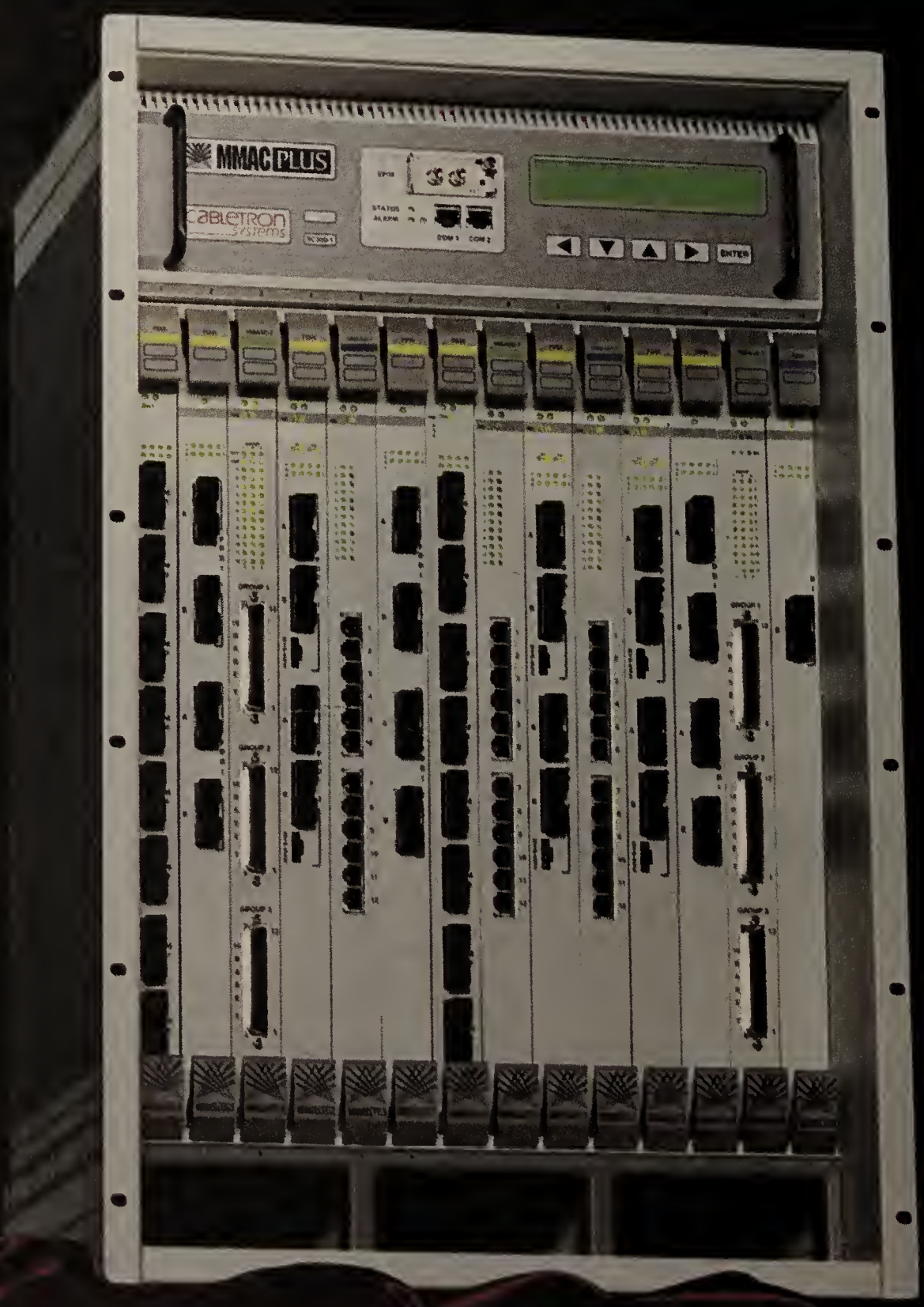

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DOD to test new E-mail encryption software

BY ELLEN MESSMER

Washington, D.C.

The top brass at the Department of Defense will soon be testing a new method for encrypting electronic mail, "signing" electronic documents and checking that E-mail they receive has not been tampered with.

Within the next few weeks, Army generals will be among the first 300 beta testers of the National Security Agency's (NSA) Tessera public-key encryption computer card based on the PCMCIA standard. The Tessera Crypto Cards are a key part of the Defense Department's E-mail system of the future, the Defense Message System (DMS). But new software announced last week will let three current E-mail packages work with Tessera PCMCIA cards, as well.

The Defense Department currently uses seven E-mail packages (see graphic), but the one most widely used — by 100,000 users — is PC Max, created by Huntsville, Ala.-based LJL Enterprises, Inc. specifically for the Defense Department.

At last week's Armed Forces Communications and Electronics Association conference in Arlington, Va., LJL Enterprises demonstrated add-on software that lets PC Max quickly encrypt outgoing messages and decrypt incoming ones.

Defense Department's E-mail mix

Company /Product	Number of users
LJL Enterprises, Inc. PC Max	100,000
Lotus Development Corp. cc:Mail	85,730
Microsoft Corp. Microsoft Mail	62,000
Beyond, Inc. Beyond Mail	28,000
Banyan Systems, Inc. Banyan Mail	27,750
Da Vinci Systems Corp. Da Vinci eMail	16,000
WordPerfect Corp. WordPerfect Office	6,000

SOURCE: DEPARTMENT OF DEFENSE, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

The PC Max software interface also lets users sign documents electronically and automatically check the integrity and authenticity of incoming documents, features available through public-key technology. LJL Enterprises is making the software available as a free upgrade to the Defense Department.

"The DOD already has a DOD-wide license for PC Max, so they can now use what they have," said Larry Leyton, president of LJL Enterprises.

LJL Enterprises will release the Tessera encryption software for Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s Microsoft Mail by April under the name ArmorMail. Versions for MS-DOS and Microsoft Windows are due March 15 and April 25, respectively. Prices will be from $86 to $125.

The word Tessera is derived from the Greek word describing small Roman tablets used as tickets or means of identification.

NSA sources said the agency is taking delivery on 1,200 Tessera prototype cards from Mykotronx, Inc., currently the government's sole source supplier. But within a few weeks, a request for proposal is expected to go out for up to 70,000 Tessera cards. Embedded in the cards is a chipset containing the NSA's Capstone algorithm for public-key encryption.

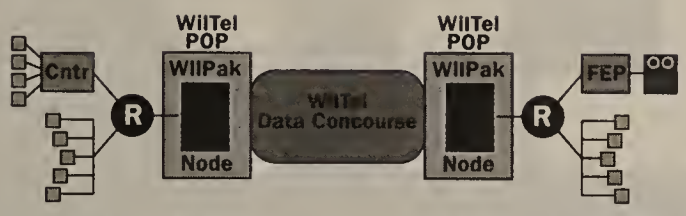
Like the so-called Skipjack private-key algorithm in the Clipper Chip chipset endorsed by the Clinton administration as a government standard, the public-key Capstone algorithm utilizes a key-escrow system that gives the government a way to unscramble the user's data.

The NSA's key-escrow system has been decried by civil liberties groups as an invasion of privacy and condemned by the banking sector as government meddling that will lead to reduced security for the private sector.

Cryptology experts insist that both the Capstone and Skipjack algorithms should be published and subjected to the scrutiny that other encryption algorithms routinely receive. But the NSA has refused, saying that publishing the algorithms would reveal the key-escrow method, rendering them useless for data protection.

The many vendors now supporting RSA Data Security, Inc. encryption technology point out that the new NSA encryption technology raises interoperability concerns with RSA.

Last week, it was revealed that the Defense Department would like to see the DMS and Tessera cards used throughout the civilian agencies, too.



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IBM keeps itself busy fighting router fires

Problems reported with 6611's DLSw feature.

BY MICHAEL COONEY

Problems with IBM's 6611 router are forcing users to at least temporarily abandon plans to mix SNA and LAN internet traffic on a common wide-area backbone.

Some users report that the Data Link Switching (DLSw) feature of the 6611 simply doesn't work — or at least not without a lot of help from IBM.

DLSw is IBM technology that lets the 6611 send Network Basic I/O System and Systems Network Architecture traffic over Transmission Control Protocol/Internet Protocol nets. It has been designated Request For Comment (RFC) 1434 by the Internet Engineering Task Force, the first step toward making it an industry standard.

"We've had to bridge the NETBIOS traffic because the Data Link Switching is not working yet on our 6611s," said Mark Curtis, manager of telecommunications and technical services for Central Maine Power in Portland, Maine. "We are working with IBM to get it up and running, and we've basically given IBM six weeks to come up with a solution."

Curtis said the boxes just cannot recognize NETBIOS traffic.

"We knew there would be some pain in getting everything working, and, ultimately, we expect we will," he said.

Julie Callahan, manager of IBM's net routing systems, said Central Maine Power's problem is a software glitch that causes the router to drop NETBIOS traffic rather than send it over the backbone.

"NETBIOS is a less well-behaved protocol than most people think," she said.

IBM has come up with a fix for the problem, which Callahan said is not widespread, but has not yet installed it.

But users at the Farm Credit Bank in Spokane, Wash., installed 52 6611s last year and had similar problems with NETBIOS.

"There was a bug in the DLSw code that wouldn't let us route the NETBIOS traffic because the router wasn't recognizing it," said Greg Veltri, manager of systems and operations. "For us, that meant most of our users couldn't access our remote databases.

"It took us almost a year to get the problems fixed. [IBM] finally implemented a software fix about three weeks ago," Veltri said. "Since then, we have been running at 100%."

As a result of the NETBIOS problems, Callahan said, IBM is now more thoroughly testing specific implementations before they go into user sites.

Analysts familiar with the problems said IBM has been fighting router fires in many of its installations.

"There were definitely problems surrounding the DLSw, but I have been told the problems have all been taken care of," said Frank Dzubeck, president of the Communications Network Architects, Inc. consultancy in Washington, D.C. "IBM doesn't want this to become a bloodbath, so it has employed an army of people to fix these problems."

"It's the first release of this kind of technology so it really shouldn't be a surprise that it doesn't work perfectly," said Robin Layland, a principal consultant with Layland Consulting in West Hartford, Conn. "It's unfortunate that users end up being the test dummies though."

Other vendors reported similar difficulties in implementing DLSw.

"We've had to do lots of work to get DLSw to work with [Logical Link Control 2] traffic," said David Berman, director of IBM networking for Wellfleet Communications, Inc., which has licensed DLSw code to use in its routers.

"The problem is almost every vendor implements LLC2 differently, so the router has to be configured differently for each vendor," Berman said. "IBM indicated to us it took quite some time to get DLSw working right in all situations."

Wayne Clark, manager of SNA development at Cisco Systems, Inc., said his company also went through a period of trial and error with routing NETBIOS.

"Just when you think you've got it down and working, NETBIOS will turn around and bite you," he said. "We've got NETBIOS down now, but IBM has only just started."

Data Link Switching checklist

- ✓ Provides SNA and NETBIOS transport over TCP/IP nets.
- ✓ Eliminates hop count limitations.
- ✓ Regulates data flow.
- ✓ Controls congestion.
- ✓ Reduces LAN overhead across WAN.

BRIEFS

Micom Communications Corp. has announced a new feature for its Marathon and NetRunner voice/data multiplexers that promises a 500% performance improvement in handling Systems Network Architecture traffic. The company's **SNA Protocol Spoofer (SNAPS)** filters out unnecessary SNA data, such as administrative packets or control characters, before it traverses the line. At the same time, the new feature offers 4-to-1 data compression.

Marathon and NetRunner integrate data, voice, facsimile and local network traffic over leased lines ranging in speed from 9.6K to 128K bit/sec. SNAPS, which is available for both products, costs $350.

Micom: (805) 583-8600.

IDEA has added support for the Point-to-Point Protocol (PPP) to its IDEAcomm Brouter and Concert Brouter products. **PPP support** will let IDEA's products more effectively route multiprotocol traffic over Transmission Control Protocol/Internet Protocol nets and interoperate with routers from IBM and Wellfleet Communications, Inc.

Available now, pricing for the IDEAcomm Brouter card starts at $2,495. Pricing for the standalone Concert Brouter begins at $6,295.

IDEA: (508) 663-6878.

Northern Telecom, Inc. (NTI) has announced availability of its Asynchronous Transfer Mode-based **Magellan Passport** switch. The switch supports a variety of traffic, from IBM's Advanced Peer-to-Peer Networking to token ring, Ethernet, frame relay, video and voice (*NW*, March 8, 1993, page 4). Prices start at $35,000.

NTI: (919) 992-2788.

Sequent Computer Systems, Inc. last week said it would incorporate Brixton Systems, Inc. Systems Network Architecture software into its **Symmetry** line of superservers.

Brixton's BrxPU2.1 SNA Server is an SNA gateway for a variety of Brixton SNA client applications, including Brx3270 and Brx5250 terminal-emulation packages, and its BrxLU6.2, BrxLU0 and Unix-to-SNA programming tools. The software will be available immediately.

Sequent: (603) 436-6690.

At the recent ComNet '94 in Washington, D.C., **Newbridge Networks, Inc.** demonstrated net management software that handles a variety of Newbridge equipment across various types of connections, including Asynchronous Transfer Mode and frame relay.

The product, Release 5.1 of Newbridge's **4602 MainStreet Intelligent NetworkStation,** runs on a Sun Microsystems, Inc. workstation and provides configuration, service provisioning, fault, trouble-ticket, performance, diagnostics and connection management for up to 2,500 Newbridge devices.

Pricing for 4602 MainStreet Intelligent NetworkStation 5.1 starts at $10,000. It is available now.

Newbridge: (703) 834-3600.

General DataComm, Inc. (GDC) recently brought out an addition to its V.fast line of modems.

The new FastPro device provides **asynchronous throughput** of up to 128K bit/sec full duplex. Its modulation scheme is proprietary, but the device can be upgraded with ITU-compliant **V.34 modulation** via a software download.

FastPro costs $675 and is available 45 days after receipt of order.

GDC: (203) 574-1118.

OSF set to enhance DCE security with new release

BY JIM DUFFY

Cambridge, Mass.

The Open Software Foundation, Inc. (OSF) will soon make it easier for users to set up a secure enterprisewide distributed computing environment by releasing Version 1.1 of its Distributed Computing Environment (DCE) software.

Products based on DCE 1.1 will allow users to further customize the Kerberos-based authorization, authentication, data integrity and privacy features found in the current release of DCE. They will also extend DCE security parameters to non-DCE applications, making the OSF technology more enterprise-friendly by enabling it to support a user's installed base.

Specifically, DCE 1.1 will support additional user attributes in its security registry, such as secondary logon passwords. For example, DCE users that also have Novell, Inc. NetWare local-area networks in their environment can now store their NetWare identity in the DCE registry.

This will let them use the DCE registry to create security files for non-DCE resources. The files could support features such as a single logon to multiple DCE and non-DCE resources, OSF officials said.

"From the centralized DCE registry, DCE allows you to build local files on local systems to do local security functions," said David Chappell, principal of Chappell & Associates, a Minneapolis distributed computing consultancy. "But it's been very Unix-oriented. Now it will let you do things on OS/2 systems, for example, or other operating systems."

Another security enhancement of DCE 1.1 will be a feature that lets users hand off their access rights to network servers to complete a job more quickly.

"The server, once it's gotten your identity from the client, can go to a file system and say, 'I'm doing this, I want File XYZ, and I've been authenticated to do this,' " said Dave Lounsbury, director of OSF's distributed environment engineering group. Currently, the server must prove its identity to the DCE security server and request permission to access a file on a particular file server.

Another step-saver in DCE 1.1 is a feature that allows users to set up a hierarchical security structure whereby a "parent" DCE cell controls security rights for multiple cells. This will obviate the need for users to exchange keys

See DCE, *page 17*

If you're constantly stuck in an SNA interconnect traffic jam, doesn't it make sense to try a different route?

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NWR9

Corporations align enterprise networks with competitive edge

Internetwork plans focus on ATM and integrated net management.

BY CHRISTINE BURNS

Washington, D.C.

International Data Corp. (IDC) unveiled the results of the second annual "*Network World* 500 survey" to 200 people during a special session at the recent ComNet '94 trade show here.

The survey demonstrated that, among other things, corporations view enterprise internetworks as competitive weapons, net decision making is becoming more centralized, and the technologies *NW* readers consider most important are high-speed local networks and net management.

"Companies used to talk about using net gateways to connect to proprietary backbone architectures," said Kim Myhre, IDC senior vice president. "What they want now is a generic, multiprotocol-based internetwork that connects all of the islands of proprietary networks in a way that maximizes the investments they've made and gives them a better way to run their business."

Kenneth Orme, an information systems specialist in Unisys Corp.'s Government Systems Group in Salt Lake City, agreed, saying his company considers the internetwork as "the tool" that everybody is beginning to use.

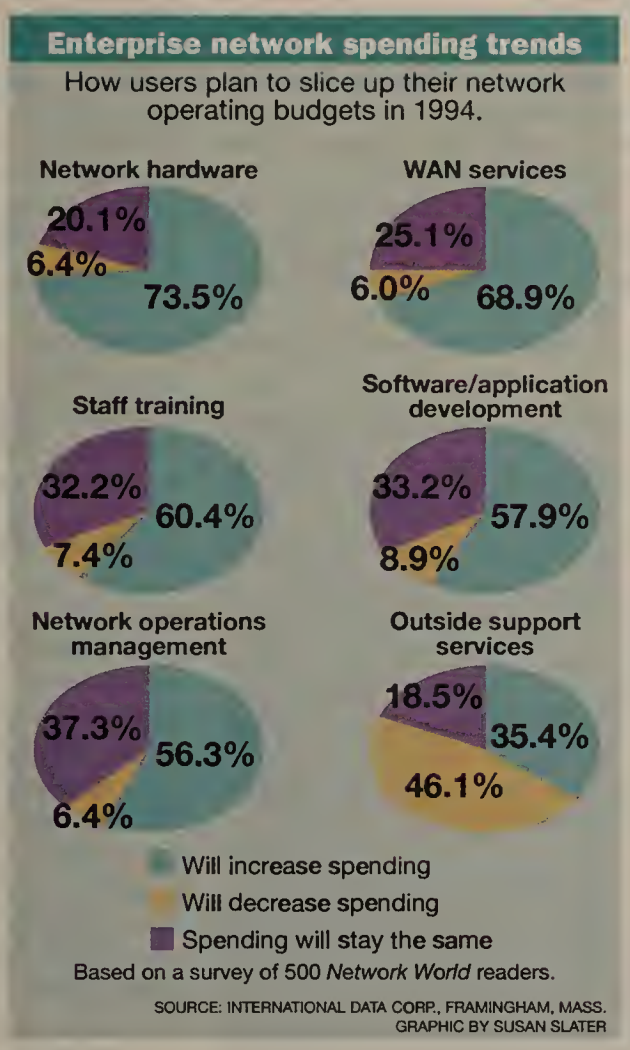
The study shows the adoption of enterprise internetwork strategies has recentralized much of the net decision making that had grown decentralized due to the growth of personal computing. Of the users surveyed, 67% said decisions regarding enterprise internetworks have become very centralized.

And for good reason. Of the 86% of executives surveyed who have laid out their internetworking strategies, their top priority is to use the internets to support business-critical applications. Protecting company investments and controlling costs followed closely behind.

About 73% of the users surveyed said capital expenditures for network equipment will rise 20% between 1993 and 1994, and another 10% from 1994 through 1996. However, overall budgets will remain flat during the next two to four years due to anticipated savings in transmission service expenditures, which comprise 30% of all network operating costs.

IDC predicts that over the next five years, shipments and revenues of internetwork equipment will increase at compound annual growth rates of 12.4% and 13.2%, respectively. By the end of 1996, IDC said that it anticipates the LAN internetwork market will generate almost $3 billion in revenues, double the size of today's market.

Jim Dertzbaugh, vice president of technical services at Integrated Communications Solutions, Inc., a Frederick, Md.-based systems integrator, said he sees two trends emerging: users looking for investments that have a life span of more than two years and technologies that automate network management. "Users just can't go with the 'two years and it's obsolete' technologies; they have to find a way to control this huge network with fewer hands," he said.



ATM/NET MANAGEMENT

According to the study, the technologies users believe will have a lasting impact on their internetworks are Asynchronous Transfer Mode (ATM), high-speed LAN implementations and integrated network management systems.

Because of bandwidth constraints placed on networks by the growing number of bandwidth-hungry applications, 72.8% of the users surveyed said they are planning to migrate to high-speed LAN solutions.

While the majority of the users saw ATM as the obvious choice, implementation time frames for the technology ranged from a month to more than five years (see graphic, this page). Myhre said the reason users do not have ATM implemented throughout their enterprise networks now is that products allowing them to do that are not yet available.

One way users are coping with bandwidth capacity problems in lieu of implementing ATM is segmenting LANs with bridges, routers and intelligent hubs.

One thing everybody agreed to is that net management is critical to their enterprise internetwork strategy. However, users said they have not yet implemented systemwide management schemes because of the lack of standards.

"Integrated net management is easy to market because it's like religion," Myhre said. "Everybody thinks it's the right thing to do, but almost nobody knows how to do it. That's why the big proprietary companies can get away with delivering a lot of smoke."

Myhre added that as users become more familiar with what they need to manage their enterprise internetworks, they will force vendors to produce integrated standards-based network management packages.

DCE

Continued from page 15

with every DCE cell they need to access, which is required in current DCE versions.

Said consultant Chappell, "At the moment, administering security among a group of cells is a little bit of work. Hierarchical cells will lessen the amount of work that's required to do that."

Lastly, DCE 1.1 will include an application program interface to allow users to add non-DCE applications to a DCE security registry. This will let legacy and new non-DCE applications be supported under DCE security servers and gain access control rights to DCE resources.

"This addresses the issues that end users today face in phasing DCE into their production environments," said Ram Kumar, OSF business area manager. "Two main reasons people move to something like DCE would be security and the naming scheme. They want to actually have the security level consistent throughout [their nets]."

DCE 1.1 will go into beta testing in the second quarter and will be generally available in the fourth quarter.

✆OSF: (617) 621-8700.

Securing the enterprise
DCE 1.1 security enhancements

- **Support for additional user attributes in Distributed Computing Environment (DCE) security registry, such as secondary logon passwords.**
- **Ability to hand off user access rights to network servers to complete a job more quickly.**
- **Hierarchical security structure whereby "parent" DCE cell controls security rights for multiple cells.**
- **Application program interface that lets non-DCE applications use DCE security registry.**

SOURCE: OPEN SOFTWARE FOUNDATION, INC., CAMBRIDGE, MASS.

INTERNETWORKING MONITOR

by Scott Bradner

Underwhelmed by the Internet — so far

As I've mentioned in past columns, there has been an awful lot of hype about the Internet of late. It has even reached the point where the *NBC Nightly News* can announce its E-mail address on the air (nightly@nbc.ge.com) without having to explain what they mean by "the Internet." But, in reality, the network itself is still puny.

I don't mean puny in reach. There is no continent on earth where there is not at least one interactive Internet connection. McMurdo, based in Antarctica, came on-line the year before last, and the networks in the former Soviet Union states have now been integrated into the rest of the Internet.

Nor is it puny in growth rate and number of users. The number of connections has been almost doubling each year for quite awhile now. In January 1994 it was estimated that there are 2.2 million computers (up from 1.3 million in January 1993) and as many as 20 million users with the capability for direct Internet access.

But the Internet is puny compared to what it can and will be. There are currently a few more than 20,000 network addresses known to the core of the Internet. This might represent a growth of 149% from a year ago, but it doesn't amount to a hill of beans compared to its potential.

Put aside for now the idea of accessing the Internet from the home for telecommuting, doing school work or even sending E-mail to a guy you went to high school with, and just look at the kinds of businesses where some type of Internet access could be useful. The potential is a bit overwhelming.

There are more than 80,000 businesses in the greater Boston area, according to my largely unscientific calculations. (I counted the number of entries on one page of the *NYNEX Business to Business Yellow Pages*, multiplied by the number of pages in the book and subtracted a fudge factor of about 25% to account for multiple listings, etc.)

The New England Academic and Research Network, one of the Internet service providers in the same area, has nearly 300 customers. The rest of the Internet providers in this area might have half as many. That means, at most, there are about 500 of the 80,000 businesses connected. (I don't expect that many of the existing 500 connections are for home use; that is still too expensive.) That works out to 0.6%.

Not all businesses, by a long shot, would have a recognizable need for Internet access today, but it surely is more than 0.6%. So there is a lot of room left under the growth curve.

Now when you start to consider the number of homes in the same area that have computers and are also wired for cable TV, the potential for this data network stuff does get to be a bit staggering.

Maybe that is why a company like MCI Communications Corp. is spending $5 million (according to an advertising trade magazine) to show a commercial with a little girl from New Zealand, dressed in black and posing in stark environments, trying to explain to a football playoff game audience just what data networking means.

Disclaimer: (from Stephen Northcutt) "These are my opinions! Harvard has traditions, NOT opinions."

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

NET RESULTS

by Mark Gibbs

Daring to test-drive NetWare 4.X

When we were kids, being a test pilot was something many of us dreamed about. We saw ourselves as Chuck Yaeger, strapped into the X-15 and laid-back even as he broke the sound barrier.

With bits of the wings falling off and vibrations threatening to shake the craft into pieces, Yaeger's only complaint to ground control was, "I'm experiencing a little turbulence up here."

Despite our awe for Yaeger and our desire to follow in his jet trail, most of us never came close to becoming test pilots. Instead, we've gone on to run networks, and over the years, many of us have lost our daring nature.

Why is it that we once had such a hunger for adventure, but our response to new product releases is often, "I'll wait and see what other people think of it?"

This was brought to my attention in searching for Novell, Inc. NetWare 4.X users.

Here's a whole new set of technologies with powerful services — most notably global directory services — that users have been seeking for years. Yet very few people are doing more than playing with the software.

Now it must be acknowledged that 4.X is not just NetWare 3.X with enhancements and an attitude. The new offering has a whole new internal architecture that changes not only how tasks are scheduled, but also how memory is allocated. These changes alone make 4.X equivalent to a 1.0 release, perhaps a good reason for users to be cautious.

The most daunting aspect of NetWare 4.X is the network operating system's NetWare Directory Services (NDS), an X.500-like global directory service that offers NetWare users the kind of services Banyan Systems, Inc. VINES users have enjoyed for years.

Having been beaten by Banyan to market with such services, Novell was forced to go one better by creating a huge and richly featured object-oriented system that should not be taken lightly.

NDS requires users to understand a new technology and make a significant planning effort.

NetWare 4.X is a challenging product to implement, but that's not why users are being cautious about migrating to the new software. It seems to be more that they simply don't want to be first.

This is strange, given that the only way to get a competitive edge is to be first.

In my search for serious NetWare 4.X users, I found many who are exploring the system on a limited basis. They may be, for example, running 4.X on one server out of a dozen, and that server is typically in the technical support department.

Is this caution due to the work involved? Thomas Edison once said, "Opportunity is missed by most people because it is dressed in overalls and looks like work."

I think the real reason why users have not flocked to NetWare 4.X is that they simply don't want to take risks. They feel that their systems are working well enough and give them enough problems as it is without trying to move to a whole new set of technologies. Yet these are the same people who decried the lack of directory services in NetWare in recent years.

Steve Nitenson, principal network analyst at National Semiconductor Corp., a company that is moving to NetWare 4.X aggressively, summed up the problem when he said, "What frustrates me more than anything is that people need to take the risk. If people don't take the risk, NetWare 4.X will not mature."

National is taking the risk and is already pleased with the results. How will its more cautious competitors feel when they realize what kind of competitive opportunity they passed up?

It is time for us to start being test pilots if we're to gain a competitive edge.

Author L. P. Smith had it right when he said, "What is more mortifying than to feel that you missed the plum for want of courage to shake the tree?"

➪ Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (805) 647-2307 or on the Internet (mgibbs@rain.org).

StarSentry Software Manager picks up NetWare support

BY CHRISTINE BURNS

Dayton, Ohio

AT&T Global Information Solutions, formerly NCR Corp., last week announced a new version of its enterprise software distribution program that includes support for Novell, Inc. NetWare.

StarSentry Software Manager 2.0 will enable network administrators — from a single management station — to distribute applications not only across Unix, DOS, OS/2 and LAN Manager systems as they could with earlier releases, but also across local and remote NetWare systems. Previously, Software Manager users needed to manually intervene on NetWare local-area networks.

The software can run by itself on a personal computer in a one-server LAN or can be used with the Simple Network Management Protocol-based StarSentry Systems Manager for enterprise control.

"NetWare connectivity is something that's always been lacking from enterprise electronic software distribution packages," said Jill Huntington-Lee, principal analyst with Brandywine Network Associates in Cinnaminson, N.J.

Frye Computer Systems, Inc. is building a NetWare software distribution product but has not shipped it yet.

Software Manager comprises three components. The first is software that sits on a management station and includes a graphical user interface and the administrative tools.

The second is software that resides on a LAN server and is used as a gateway through which software is distributed to clients. The third component, client software, keeps track of applications residing on individual client systems.

According to Bill Armstrong, senior product manager at AT&T Global Information Solutions, the new version of Software Manager is easier to use than its predecessor. It supports predefined installation and deinstallation scripts that walk a network manager through the processes. The Motif-based interface also requires fewer steps to execute the software distribution routines.

Software Manager 2.0 is available immediately. Management console software costs $15,000, while network server and client licenses cost $300 and $60, respectively.

The interface also lets a net administrator selectively distribute software to users based on certain attributes, such as the kind of computer they're using.

In addition to existing support for Transmission Control Protocol/Internet Protocol, Open Systems Interconnection and Systems Network Architecture nets, Software Manager also supports dial-up connections to let remote clients receive software upgrades over standard telephone lines.

©AT&T Global Information Solutions: (513) 445-5000.

BRIEFS

Intel Corp. of Hillsboro, Ore., last week dropped the price of its StorageExpress **backup and storage servers** by as much as 33%. The company cut prices to better position the servers — which typically reside in large, multiserver environments — for single-server nets. The entry-level StorageExpress ELD, formerly $7,495, now costs $4,995. The higher end XLD and XLE models cost $7,995 and $12,495, respectively, down from $9,995 and $13,495.

Intel: (800) 538-3373.

Boise, Idaho-based **Extended Systems** last week rolled out a multiprotocol **token-ring print server** that concurrently supports Novell, Inc.'s NetWare, Microsoft Corp.'s LAN Manager, IBM's OS/2 LAN Server and Unix network operating systems running Transmission Control Protocol/Internet Protocol. The server is available for $895.

Extended Systems: (800) 235-7576.

NetManage, Inc. of Sunnyvale, Calif., last week rolled out software that lets Windows NT computers act as servers in a heterogeneous network.

The company's Chameleon32NFS incorporates support for the Unix-based Network File System protocol for sharing files. Chameleon32NFS costs $695 per license.

NetManage: (408) 973-7171.

NETstor, Inc. of Minneapolis last week announced NetBack/R, **network backup and recovery software** that provides backup across enterprise nets for servers and clients. The software gives a network manager a single point of control for all backup processes regardless of where backup devices are located.

NetBack/R software costs $4,000. The software will provide backup for networked computers running operating system software from Apple Computer, Inc., Digital Equipment Corp., Hewlett-Packard Co., IBM, Microsoft Corp. and Sun Microsystems, Inc.

NETstor: (800) 423-3020.

Network testing firm **LANQuest** of San Jose, Calif., last week rolled out a test management product that provides centralized control of application- and file-level testing on nets.

LANQuest's ToolBox software sits on a personal computer-based management station and gives network managers the ability to measure the reliability, availability and response time of the network and network-based applications running on up to 250 DOS, Windows and Windows NT PCs. ToolBox includes automated test scripts to help managers evaluate and compare new products as well as to conduct capacity planning.

ToolBox is available for $4,995.

LANQuest: (800) 487-7779.

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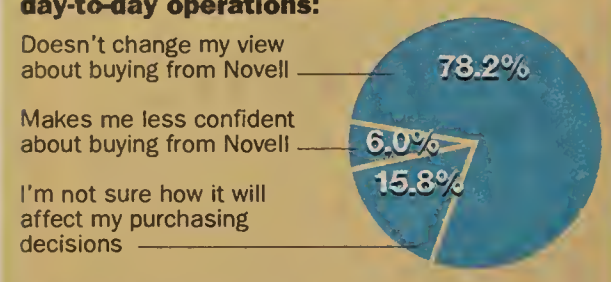
Au Ray-voir

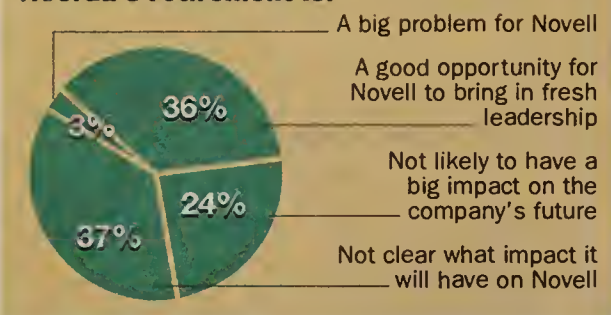
Users react to Ray Noorda's decision to step down as chief executive officer of Novell, Inc.

Customers aren't overly concerned about Noorda's retirement...

Noorda's decision to step back from day-to-day operations:

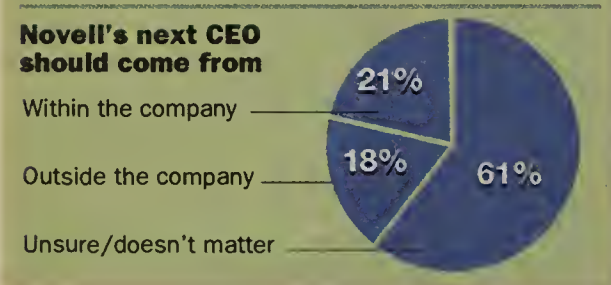


Noorda's retirement is:



...and they're mixed on where his successor should come from...

Novell's next CEO should come from



...but they know what they want from Novell's next leader.

The most important skill Noorda's successor should bring to Novell is:

- Technology vision and experience (80.2%)
- The ability to manage an increasingly large and diversified company (76%)
- The ability to establish and capitalize on partnerships with other companies (76%)
- Marketing ability (44.8%)

(Multiple responses allowed)

The most important priority for Noorda's successor is to:

- Improve the core NetWare technology to support client/server applications (4.47*)
- Improve service and support (3.83)
- Expand Novell's partnerships (3.78)
- Improve network management offerings (3.54)
- Accelerate the diversification of the product line beyond NetWare (3.47)
- Improve marketing to keep Novell competitive (2.42)

*Mean rating on a scale of 1-6, where 1 is least important and 6 is most important.

The results are based on a telephone survey, conducted by Focus Data, Inc., of 101 *Network World* readers. Of those respondents, 87 currently use NetWare.

GRAPHIC BY SUSAN J. CHAMPENY

Who's next at Novell? The

Noorda's successor must have vision to bring company

With rumors flying about Ray Noorda's successor, *Network World* asked customers, financial and industry analysts, vendor executives, and others to offer Novell, Inc. some advice on what to look for when choosing a CEO to steer the firm in the '90s.

Noorda's business acumen and unmatched skill at establishing partnerships propelled Novell to a leadership position in the networking industry. He has announced plans to step down as chief executive officer by June, although he'll remain as chairman of the company, and Novell is looking for his replacement.

Observers say Noorda's successor faces a variety of challenges, the biggest being to help Novell establish and execute its enterprise computing strategy. According to these users and others, Novell has to move beyond its work group computing roots and needs a leader with the 'vision thing' and the technology, marketing and business savvy to help the firm make this critical transition.

After you read these comments, let us know what you think.

Howard Maynard

Senior vice president, MIS director
Young & Rubicam, Inc.

You could argue that because the world for the next 10 to 15 years is going to be so different, you need someone to take the reins who has not grown up within Novell. The key challenges for Noorda's successor will be to figure out how Novell's relatively narrow product line fits into the bigger world of enterprise computing. One possibility would be someone like Robert Kavner, [AT&T's executive vice president and CEO of multimedia products and services], who comes out of the communications area from a different and broader dimension. Knowing the LAN well is not the issue; they need someone who understands a bigger picture.

David Passmore

Independent networking consultant, Herndon, Va.

It is not clear that it was Noorda's vision driving the company during the last couple of years, so his retirement may not have that big of an impact. Meanwhile, Novell faces two primary threats. The first is the transition of network operating systems to an enterprise environment. In many large companies, you will no longer have stand-alone NOSes.

What makes this particularly challenging is finding out who the buyer is and what the right channels are. These can no longer be sold by your ma-and-pa [value-added reseller]. A successor must start dealing more with larger systems integrators and people capable of hitting the corporate [information systems] group. This person will have to hire others who can think like corporate IS managers and understand the distribution channels to reach that target.

Novell will also have to deal with the NOS being consumed by the operating system. Traditional file and print services, security and other network functions are getting bundled with the computing platform OS. Novell's challenge will be to maintain a market for separate network operating systems in the face of this consolidation.

Paul Johnson

Vice president, senior technology analyst
CS First Boston

Ray leaving in itself is a neutral or only slightly negative move. Having him hold on to too much power for too long would be a greater negative. There's no doubt he's been an inspirational leader, but it's time for new leadership at Novell.

My favorite candidate is Richard King [executive vice president of the NetWare Systems Group]. He has technical experience in Novell's R&D group. He's an engineer and will have the respect of other engineers. He spent the last few years building the service and support group and is now running NetWare. He needs about six more months of seasoning in running a product group, then he'll be ready.

There are two key challenges: set an enterprise net product direction Novell can execute and address the needs of its $800 million work group business.

The company needs to figure out how to attack the enterprise computing market using a combination of NetWare Directory Services, Unix and other technologies. Novell also needs to establish a business model to help it take the next step in the work group market. It needs to come up with a way to make its enterprise focus complement its work group strategy. I don't think Microsoft Corp. can do this if Novell executes its enterprise strategy. If not, Microsoft will have a shot at these markets.

Mark Brooks

Former president, current advisor
NetWare Users International
Senior LAN analyst
Teachers Insurance and Annuity Association College Retirement Equities Fund

The biggest loss Novell faces is the vision Ray supplied. He could envision the future and understand in simple terms what customers need. He was also extremely good at overseeing the implementation of his ideas and is excellent at trusting others. He always got things rolling; he was a great implementor. Those are his strengths. Others may have difficulty having both the vision and the capability to implement it.

Whoever takes the helm at Novell needs the vision of [NeXT Computer, Inc. CEO Steve] Jobs, the guts of IBM's [CEO Louis] Gerstner and the leadership of Noorda. This person needs to have the type of personality that can handle strong personalities at the top and let them know who's in charge.

Don't rule out Novell asking Jim Bills [a former Novell executive vice president] if he would be interested. [Lotus Development Corp. CEO Jim] Manzi would be another potential, but I'd bet on Bills because he had good leadership and the people at Novell know him and what he stands for.

David Mahoney

CEO
Banyan Systems, Inc.

Noorda is leaving Novell positioned to do very well in the future. His most important legacy will be the creation of a long-term viable competitor to Microsoft in the computer industry.

Those who fear that Microsoft will dominate or monopolize the industry have Noorda to thank for giving them options in network and desktop operating systems, particularly given his recent Unix initiative.

Novell's challenge in leveraging the 'Noorda legacy' will be in finding ways to make the risky, bet-the-farm type of decisions Ray has become famous for and managing through bad decisions so you don't actually lose the farm.

Noorda's successor will face the dual challenges of joining the battles with Microsoft at all levels while continuing the struggle to evolve NetWare to meet the needs of the next generation of enterprise computing. Novell has bitten off a tremendous amount — not just in development tools. It faces strong competition in all these areas. At the same time, it faces some major product development challenges in evolving NetWare to address the complexities of enterprise computing and network services.

Rich Rosdal

President
NetWare Users International, North America

My impression is that NetWare users have a high degree of confidence in Ray Noorda, as well as in Drew Major [chief scientist at Novell]. Drew has been a tremendous force to guide Novell from a technical standpoint, and his influence will still be felt. The point is that users have confidence in Novell's entire board, not just in one person. Is there insecurity about Ray leaving? I would say no.

Frank Dzubeck

President
Communications Network Architects, Inc.

Ray had the proper vision for the proper time. He did a great job and drove the company in a personalized manner. When he

industry has its say

beyond work groups into enterprise networks.

leaves, the company will be restructured along more classic business lines. In the next generation of the company, you have to have a much more organized approach to things. All companies go through this.

This shift will require Noorda's successor to be more of a traditional business manager. You have to be a financial manager.

The person also needs to be a marketer with a vision. The vision in the first generation of the company was NetWare. In the next generation, the vision needs to be something else.

David Wu

Computer analyst
S.G. Warburg & Co.

[Novell needs] a good businessman to run the shop. They already have many technical visionaries, such as [Chief Technology Officer] Kanwal Rehki. They need a deal maker — the whole company has been raised on making the industry work together.

They have to get the Unix Systems Group to work better within itself and with the rest of the company, and they need to figure out how to sell Unix. Novell's AppWare development platform has a lot of appeal, but it still needs a lot work and developer support.

John Rymer

Vice president
Patricia Seybold Group, Inc.

Frankly, I worry about Novell. The whole world is swinging over to Windows — NetWare's the connection of last resort. It's just not clear that you need a separate networking platform — it may be advisable to cut NetWare completely out of your environment.

How relevant is NetWare in a client/server world? The core NetWare technology needs improvement, particularly in the critical areas of cost-effectiveness, ease-of-use and application development.

It may have been difficult for Noorda to understand the need for developing a different model for success.

This inflexibility caused Novell to completely mishandle Unix. Novell remains wedded to IPX/SPX when the rest of the world is TCP/IP. It has also impeded Novell's ability to strike effective partnerships. Novell is aligned with Borland [International, Inc.] and others in the anti-Microsoft camp and has to be careful not to get in with the wrong crowd.Noorda's leaving could present Novell with the opportunity to get its act together.

Scott McNealy

Chairman, CEO
Sun Microsystems, Inc.

It depends on whether or not they can recruit a superstar like Ray. If they can't, then it will have a huge impact.

The person [who succeeds Noorda] needs to be strong enough to go toe-to-toe with Microsoft. The successor needs to understand that there are millions of users whose needs have to be met.

Novell equals NetWare, so the first challenge is keeping the market position for NetWare. The good news is that it is well positioned today. The bad news is everyone else understands the importance of networking in the '90s and will be coming after Novell. Whoever the successor is, he or she needs to continue to leverage the alliances that Ray Noorda established with the Unix vendors in order to continue to compete with priority environments like IBM's OS/2 and Microsoft's Windows NT.

Mark Gibbs

Consultant, Ventura, Calif./*Network World* columnist

I predict there will be a period of corporate confusion. If it's not over quickly, it will start to impact the product strategies.

The big issue will be how Noorda's replacement conceives the corporate business. Making NetWare the strategic equivalent to UnixWare and AppWare has already caused a certain amount of confusion. For a company growing as fast as Novell, maintaining corporate cohesion is hard.

The person who replaces Ray will need vision, clear thinking, willpower, the ability to work ridiculous hours and the willingness to take calculated risks. Mary Burnside is a good contender -- she's one of the toughest and more effective executives Novell's got. And she's survived where others, like Darryl Miller [former Novell executive vice president], haven't.

It might be interesting to see [Former Apple Computer, Inc. CEO] John Sculley, one who can look at a company as a marketing entity, heading it up.

After all, Novell has big challenges coming up, the biggest being the need to fight off the rest of the market. Jim Manzi might be interesting. He's a skilled executive, and his role at Lotus prepares him for the scale of operations at Novell. Lotus is the one company that understands marketing and networking.

Mitchell Kertzman

Chairman, CEO
Powersoft Corp.

It's always traumatic for an organization to lose the regular presence of the person who has provided its culture, its mission, its public identity.

This is one of those unusual cases where a CEO is going to have an impact on that choice [of successor]. So the opportunity exists for Ray Noorda to make a positive statement to his employees, his market.

In the last few years, Novell has looked more like it is responding to Microsoft than pursuing its own vision. [Novell needs] the kind of person who can come up with a strategy vis-a-vis Microsoft. There is that old saying in baseball, 'You should hit them where they ain't.' Their strength is in networking, and that isn't Microsoft's strength.

Cheryl Currid

President
Currid & Co.

The successor doesn't have to have Ray's vision — he just has to have a vision, period. Ray's vision was networking. The next head of Novell should have a vision of catapulting the networking industry into the next era.

The person to replace Ray has to be a nonlinear thinker. Al Gore would be perfect for the job — it's too bad he's already got one. Noorda's replacement needs to have a burning pit of desire in his stomach to drive the company forward. Jim Manzi or [Borland CEO] Phillipe Kahn would be good candidates.

[The successor] will have to show a command of what's going on in the industry and light a path with a vision to the future. Unlike a leader who has the luxury of focusing inward first, then outward, Noorda's replacement has to come in and articulate a strategy as soon as he takes the job.

Greg Scott

Computing services manager
Oregon State University's College of Business

As a consumer of technology, I think Novell has been reasonably good at not resting on its laurels. The firm recognizes that it's not just file and print services it needs to provide. Novell knows it must provide tools for application development and support for video.

To Noorda's credit, Novell is already working on its AppWare application development framework, acquired video know-how when it purchased Fluent [Inc.] and has also undertaken a Unix initiative.

If there is a problem the new leader will need to face, it's that Novell has a lot of commitments on the table right now. The type of person most likely to deliver is someone cast in the Noorda mold — someone who doesn't need his ego stroked. I don't think Novell needs a radical reshifting right now. It has a lot of things in the works and needs to deliver on them.

Hewlett-Packard Co.'s Richard Hackborn is a prime candidate [to replace Noorda]. He has the same value set I perceive Ray Noorda as having. He is family-oriented, very personable.

I have nothing but the utmost respect for the man. From a financial standpoint, he is clearly one of the most successful managers to come out of HP.

Bill Nussey

President, CEO
Da Vinci Systems Corp.

Noorda's replacement needs three qualities — he has to be someone with a thorough understanding of the company's product, a consummate businessman and somebody with a lot of charisma. That's a tall order because there are only a few such executives in the industry, such as Jim Manzi at Lotus and Larry Ellison at Oracle [Corp.].

But it's vital because the company has suffered from a lack of top-down management over the past year as Noorda has stepped away from day-to-day operations. Novell has been unable to focus its product and marketing efforts and, in the future, could expose its core business — network operating systems — to competitors, such as Microsoft, as it moves into new high-end products.

I'm totally confident they can rebound because no firm in this business is more customer-driven than Novell, that's why they're so successful.

Kim Myhre

Senior vice president
International Data Corp.

There is a consensus that Noorda has been at the heart of Novell's success. While he didn't do it alone, his sensible, somewhat homespun style, his lean toward fiscal conservativeness and his vision of the importance of 'coopetition' to inspire industry growth have all set the stage for Novell becoming the industry powerhouse it is today. This kind of leadership is often underestimated in a business made up of too many technologists, professional business managers, accountants and general know-it-alls. This kind of vision can't be recruited. It may not even be able to be learned. And it will certainly be missed when Ray is gone.

SHORT TAKES

"Ray was the leader in terms of supplying the visionary element that is so essential in riding that first big win into a second one. The key to success for Noorda's replacement will be in bringing out next-generation products, which means vision should be the top job requirement."

Ralph Ungermann
Founder
Ungermann-Bass, Inc.

"The No. 1 priority for the new chief executive will be getting a stable version of NetWare 4 out the door. We don't need any more 'just kidding' versions."

Glen Fund
President, Greater Boston Area Novell Users' Group/Principal research specialist
Lockheed Sanders, Inc.

"Ray has had a tight grip on Novell. Bringing in someone new will open them up to moving in different directions.

Novell is no longer a start-up — it's a major corporation that requires management and marketing skills for an organization of that size."

John Shortall
Project manager
Air Canada

"A lot of companies go for the professional manager. Noorda must succeed himself with someone as creative and visionary as he is, not a bean counter, not an ex-IBM or -AT&T type that is a good general manager."

Howard Anderson
Managing director
The Yankee Group

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Network Equipment Technologies

NYNEX cries foul as CAPs spirit away customers

BY DAVID ROHDE

White Plains, N.Y.

It's getting painful for NYNEX executives to go away on business.

The reason: The New York Telephone logos once emblazoning the pay phones at New York airports have all been replaced by logos representing Teleport Communications Group, a competitive access provider (CAP) based in Staten Island, N.Y.

TCG has signed a five-year deal with the Port Authority of New York and New Jersey to operate all the pay phones at La Guardia, John F. Kennedy and Newark airports; the Port Authority Bus Terminal; and several bridges, tunnels and piers.

CAPs make inroads in NYNEX territory

Nationwide, competitive access providers (CAP) are estimated to have captured less than 1% of the RBHCs' business. But in the New York metropolitan area, NYNEX claims CAPs have an estimated:

30% of the top 100 business customers.

40% of special access business.

18% of interstate access business.

SOURCE: NYNEX CORP., WHITE PLAINS, N.Y.
GRAPHIC BY SUSAN J. CHAMPENY

NYNEX Corp. officials think they have a way to make the deal work to their advantage, though. NYNEX is pointing to the Port Authority deal and other CAP services to prove that it needs regulatory relief from a rapid loss of market share to CAPs in the New York area.

NYNEX recently requested a waiver from FCC rules that require it to charge 3.9 cents per minute for all types of switched access — residential or business, single line or multiline.

The regional Bell holding company wants to reduce that charge to about 2 cents a minute for larger businesses in high-density zones such as Manhattan and Boston. Its real cost to provide switched access is about 1 cent a minute, said Dee May, NYNEX's director of federal regulatory issues.

NYNEX and the other RBHCs have more flexibility on special access rates, where they compete with CAPs for high-capacity dedicated lines from company premises to interexchange carriers' points of presence.

But the mandated switched access charges hurt NYNEX in bids like the one it recently lost for a new integrated three-campus network at Long Island University in Brookville, N.Y.

Under a contract with AT&T and Cablevision Systems Corp., the university bypasses the local public switched network to provide — from every student's room — a combination of intracampus, local and long-distance telephone service as well as access to the school's computer center.

The network was built with fiber optic links among the campuses provided by Cablevision Lightpath, Inc., a subsidiary of the cable TV company. NYNEX complains that because of its switched access rate structure, it bid $22 a line for the contract, while the Cablevision-AT&T bid came in at $15 a line.

"We went as low as we could," May said.

But observers question whether NYNEX's cost structure is solely to blame for its losses to new CAP and cable competition.

"It's not a cost issue," said Al Bieber, president of the Communications Managers Association. "It's basically one of reliability and redundancy."

Bieber's own company, Dow Jones-Telerate in Jersey City, N.J., buys local service from NYNEX, Teleport and MFS Communications Co. of Oak Brook, Ill.

See NYNEX, *page 25*

FEDERAL REGULATION

PBX makers on the defensive about fraud

BY DAVID ROHDE

Washington, D.C.

Bristling at suggestions that they be held liable for toll fraud, PBX manufacturers said users must take advantage of antihacker tools they already have before looking to shift the blame.

Private branch exchange vendors at the recent ComNet '94 show here were responding to letters asking the Federal Communications Commission to require both common carriers and customer premises equipment vendors to share liability for PBX fraud losses (*NW*, Jan. 24, page 34).

"We give our customers a lot of protection, but they don't choose to use it," said David Tucker.

The FCC's original Notice of Proposed Rulemaking suggested only that customer premises equipment vendors put risk warnings on their equipment and supply educational materials.

"All the [antifraud] tools have been built into our systems and others'," said Scott Augerson, deputy director of the Network Systems and Services Group at Rolm in Santa Clara, Calif.

"We give our customers a lot of protection, but they don't choose to use it," said David Tucker, director of marketing for InteCom, Inc. in Allen, Texas.

Several vendors said they recently toughened their password protection by requiring users to choose their own passwords — rather than use preconfigured ones — to unlock their PBXs.

The moves invalidate the complaint that PBXs are only shipped with default passwords that are easy for hackers to guess, said Mike Tillman, senior manager of consultant programs at Northern Telecom, Inc. (NTI).

Some vendors even establish multiple levels of passwords for direct-inward system access (DISA), Tucker said. InteCom allows users to change passwords as often as every five minutes.

InteCom is also developing voice recognition for DISA so employees calling remotely can gain access without punching in passwords, he explained. Voice recognition for DISA will probably be ready by year end, he said.

Several users reported to the FCC that they had been victimized by hackers gaining access to remote maintenance administration ports, frequently through stolen passwords. NTI and InteCom said their PBXs now respond to such calls by hanging up and then calling back the proper party.

The vendors questioned the need for a federal mandate requiring warnings and educational materials, saying they already take these measures.

Hoisting a thick security manual, Tillman said his firm has discussed security matters at 22 user meetings in the U.S. and 13 in Canada during the past year.

BRIEFS

MCI Communications Corp. will come out March 1 with enhancements to its switched data offerings, to be sold under the carrier's new DataStream service label. MCI will add basic-rate (128K bit/sec) Integrated Services Digital Network service and plans to come out with **multirate ISDN** capable of Nx64 connections in the fall. The company also plans to offer a Windows-based graphical user interface that allows dynamic **bandwidth management** for its T-1 service.

Meanwhile, **MCI** has named Albert Grimes vice president of development in its wireless communications services division. Grimes was previously president of **American Personal Communications,** one of three companies to receive a "pioneers preference" license for personal communications service spectrum from the Federal Communications Commission.

Wireless net service provider **RAM Mobile Data** and Orlando, Fla.-based **HTE Public Safety Corp.** have teamed to provide **wireless data** networking to police, fire and other public safety organizations. HTE Public Safety is offering access to RAM's packet radio data network through its public safety software packages and is handling systems integration for customers (see story, page 25).

AT&T Network Systems has rolled out a miniversion of its 20G bit/sec GCNS-2000 Asynchronous Transfer Mode (ATM) switch that runs at 2.4G bit/sec. AT&T said the GlobeView-2000 device, which competes with switches from StrataCom, Inc., Newbridge Networks, Inc. and others at the low end, should allow corporate customers to gain **video on demand** and other **switched multimedia** services sooner and more ubiquitously by allowing smaller carriers to get into the ATM market.

Three large users have inked multimillion-dollar contracts with **AT&T** for long-haul services. **Chevron Corp.** has signed a $42 million Virtual Telecommunications Network Service (VTNS) deal; **Owens-Corning Fiberglass Corp.** awarded AT&T a four-year, $12 million VTNS contract; and **Banc One Corp.** signed a series of deals for 800, VTNS and Software-Defined Network services.

Northern Telecom, Inc. is moving forward in its efforts to install commercially available components in its private branch exchanges so third-party vendors can participate in application development. The company has unveiled an upgrade for its midsize Meridian 1 Option 61 that uses off-the-shelf CPUs, memory cards and I/O cards. It doubles the processing power of 200- to 2,000-line systems and quadruples memory capacity.

Regional Bell holding company **Ameritech** is launching a **digital video** network upgrade slated to connect 6 million customers to interactive information services by the end of the decade. The company said that by late this year it will begin delivering initial services, including video on demand, home health care, interactive educational courseware and distance learning.

Primary Access Corp. said it will add **AT&T Paradyne's** Enhanced Throughput Cellular error correction protocol to its cellular modems. Primary Access already supports the competing **Microcom, Inc.** Microcom Network Protocol-10 protocol; support of both will allow mobile users with either protocol on their cellular modems to communicate with any traditional land-line modem.

When it comes to high-performance hubs, the new DEChub™ 900 MultiSwitch is a whole different animal. For starters, it is the only hub with a technology-independent backplane that supports up to eighteen separate LAN segments, including Ethernet, Token Ring or FDDI in any slot. And it's ATM-ready today. The DEChub 900 MultiSwitch ensures your network can handle future growth and changes. Over 3GB of throughput gives you all the bandwidth you'll ever need to send anything, anytime.The DEChub 900 MultiSwitch is the most flexible and cost-effective hub around. DEChub 900 modules, as well as the award-winning DEChub 90 modules, all work as single units or snapped into the DEChub 900 MultiSwitch backplane. And all DEChub modules are truly "smart"— just power them up and they know what to do. Management has never been simpler. You can manage the DEChub 900, DEChub 90 and all DEChub modules from a single PC or workstation. And the graphical user interface of our HUBwatch™ software makes switching and reconfiguring LAN segments as simple as the click of a mouse. Curious to know more about this interesting creature? Then call your local Authorized Digital Reseller, or 1-800-DIGITAL. Please reference BFA when you call. And get a hub that shows its true colors when it's time for a change.

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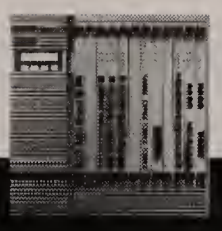

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Wireless database access takes a bite out of crime

BY JOANIE WEXLER

Cleveland

While debate rages across the country over ow to deal with the nation's growing crime roblem, Cuyahoga County in northeastern hio has begun using wireless network ser-ices to help keep the peace.

Last week, the Cuyahoga Regional Infor-nation System (CRIS), a law enforcement gency providing database services, made its epository of crime-related records available to ie 84 criminal justice departments in the ounty via the RAM Mobile Data packet radio et. The goal is to let roaming police officers irectly access information such as arrest his-ories and car registration records.

Today, regional criminal justice organiza-ons access the database from 700 terminals onnected by land-lines. Those terminals are sed by dispatchers, who feed requested infor-nation via voice radio to officers in their cars.

The wireless net will let police bypass the verworked, centralized dispatchers, shaving s much as a minute off each transaction, said Villiam Allen, manager of the CRIS Center. he net will also allow officers to take more reventive measures in enforcing the law by ncouraging them to slice and dice data in new ays that reveal trends and patterns, he added.

CRIS is networked to the Law Enforcement utomated Data System, which is maintained y the Ohio State Highway Patrol, and the FBI's National Crime Information Center.

CRIS has been piloting the RAM service with 57 police cars since December. The now-countywide system will cost about $5 million over five years in mainframe connectivity, hardware and airwave usage charges.

Each patrol car is outfitted with a GRiD 1680 laptop computer running application software developed by Allinson-Ross Corp. of Ontario and radio modems from Ericsson GE.

RAM and CRIS are also teaming on an application that will allow images, such as fingerprints and mug shots, to be downloaded to officers on the street. While RAM's low 8K bit/sec network speeds would seem prohibitive, "there are new technologies RAM is looking at that combine major-league compression and ways of reconstructing graphics," said Andy Seybold, a consultant and publisher of the *Outlook on Mobile Computing* newsletter in Boulder Creek, Calif.

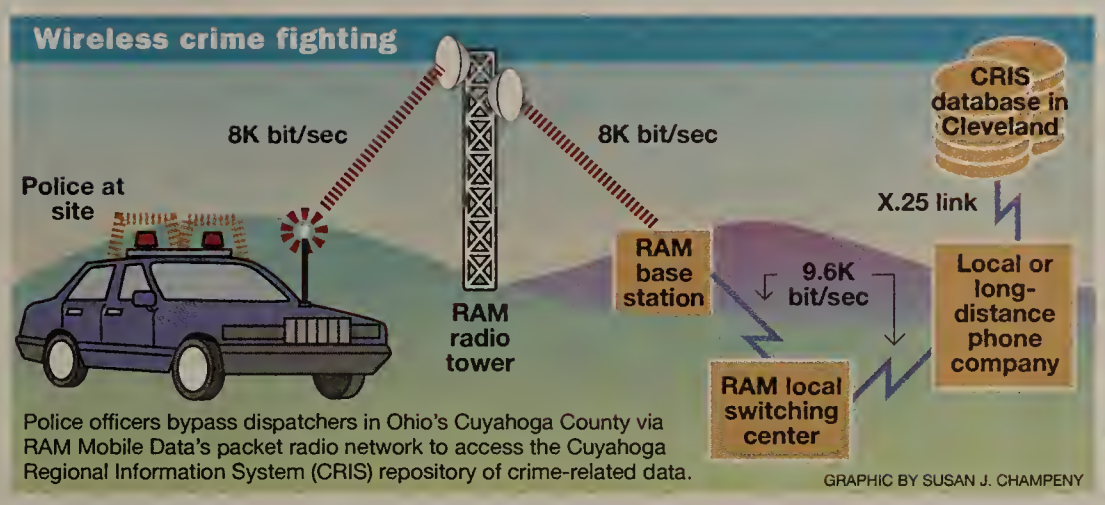
The technology sends representations of an image rather than the whole file to minimize bandwidth use. Seybold, who has tested the technology, recently sent an 85K-bit file that was compressed down to just 4.9K bits. "It was reconstructed at the other end, and you couldn't tell it from the original," he said.

When CRIS put out the bid for a wireless service in the summer of 1992, only RAM and its archrival, ARDIS Co., responded, Allen said. RAM won largely because of its expansion plans for coverage and its pricing structure — the company was willing to put a monetary cap of $100 for monthly airwave usage on each end-user device.

"We were afraid about paying for unpredictable usage of the airwaves," he said. Indeed, monthly transactions went up 600%, resulting in a sharp increase in arrests.

According to Allen, ARDIS was willing to go the monthly cap route but "put so many exceptions in the bid it was very difficult to analyze what the costs would be."

Security was also an issue, he noted. Charles Nahabedian, vice president of network business development at RAM, said his company has 10 to 30 channels available in all its major service areas. Since the mobile unit decides which channel it will use to transmit a given packet, it would be nearly impossible for a scanner to tap into the right channel at a given moment, he said.



Police officers bypass dispatchers in Ohio's Cuyahoga County via RAM Mobile Data's packet radio network to access the Cuyahoga Regional Information System (CRIS) repository of crime-related data.

GRAPHIC BY SUSAN J. CHAMPENY

NYNEX

Continued from page 23

Since so many firms use multiple local carriers, observers question NYNEX statistics showing that they're losing up to 40% of market share in certain large-business indexes.

"It is unclear how much traffic actually is being diverted to competitors' networks since NYNEX itself admits it must estimate the amount of traffic its competitors carry," said Donald Evans, MCI's director of federal regulatory affairs, in a comment letter filed last week at the FCC.

It is the loss of the Port Authority pay phone business at public transportation facilities — following earlier losses to Teleport for the Port Authority's internal voice and data traffic — that rankles NYNEX the most.

"The public phone market in those places is phenomenal," said NYNEX's May. "That one really hurt us."

RATE & TARIFF MONITOR

by Eric Paulak

'94 forecast: blizzard of tariff action

A lot of consultants have been commenting about what a busy year 1993 was for tariff activity in the long-distance market, but nobody pinned down just how busy it was. Until now.

We analyzed all the services offered by the four largest long-distance carriers and how often rates changed for each within a given month and for the whole year. The results, especially in the second half, are a good sign of what you can expect for the next several years or until Congress or the Federal Communications Commission free the local exchange carriers (LEC) to enter the long-distance market.

Between AT&T, MCI, Sprint and LDDS Metromedia Communications Corp., 156 rate increases for inter-LATA interstate services were introduced last year — an average of 13 rate increases per month. Not surprisingly, AT&T led the pack with a total of 71 price hikes, 47 of which came in the last six months of the year.

MCI weighed in with 40 rate increases, 58% of which were in the second half; Sprint kept its usual third place position with 34 increases, 56% in the second half; and Metromedia had 11 rate increases, 73% of which came in the last six months of the year.

The carriers offered some relief on long-distance rates but not much. Only 65 rate decreases were introduced all year. AT&T had nearly half with 30, but most of those were part of overall rate restructuring, in which the national average for a particular service went up, but in a few areas the costs went down.

On the intrastate, inter-LATA side, the results show a rapidly changing and more competitive market. With 50 states, there are more opportunities for rate changes. So to keep from skewing the results, if a carrier introduced the same rate change in multiple states, it only counted as one rate change.

The same four carriers introduced 589 such rate changes last year, an average of almost 50 per month. The good news was that decreases outweighed increases by 321 to 268. And AT&T once again showed its market-leading might with half of all the changes.

The second half of the year was about six percentage points behind the first, but both December '93 and January '94 saw record numbers of rate changes — 85 and 69, respectively. Look for more of the same for the rest of the year as the long-distance carriers gear up for more competition.

On the international side, last year was almost all bad news. From March through December, there were 60 rate changes and 75% of them were increases. AT&T raised its international rates 19 times; MCI, 13; Sprint, 10; and Metromedia, 3 times.

Think 1994 will be any better? Not a chance. January saw the rates for 21 international services increase. MCI and AT&T both hiked rates on 10 of their services and Sprint did the same on one. None of the major carriers decreased rates for any international services.

So what do all these figures mean to you?

First of all, they give you an idea how stable your long-distance budget is going to be for the next year. If you want the most stability, go with Metromedia or Sprint. They also tend to have lower prices. The only drawback is they typically have fewer choices in the types of services offered and where they're available.

The figures also hint at what's coming in the next couple of years. The long-distance carriers are concentrating their changes in the intrastate markets.

The reason: The first long-distance market opened to the LECs is very likely to be for intrastate service within their regions.

By making their rates more competitive now, the long-distance carriers will have an advantage over the LECs when they are let into the marketplace and the LECs will have less of a margin to play with if they are to make a profit on long-distances services.

Paulak is associate publisher for the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 327.

DISTRIBUTED DATABASES

Vendors push parallel path for databases

BY PETER LISKER

The leading database vendors are moving aggressively to support parallel processing, a technology that promises users major performance gains but could raise significant network design challenges.

Both hardware and software vendors are positioning parallel processing as an ideal tool for downsizing applications, like databases, from mainframes to client/server nets. They claim that parallel processing — the spreading of applications across multiple processors on a single system or across a network — will speed application processing and make more efficient use of computing resources.

Users and industry observers are excited about the technology, although they question how to best integrate parallel processing into their existing network environments. Now a number of vendors, including Informix Software Corp., Oracle Corp., Sybase, Inc., are hoping to provide the answer.

"We're actively looking at how to implement parallel processing database systems and what the real advantages would be to our environment," said Larry Gahagan, principal consultant for British Petroleum's Global Information Technology group in Houston. "The ability for the database to operate in parallel would give us better control of our [network] environment by letting us more efficiently utilize the distributed [computing] capabilities we've designed into the system."

Peter Kastner, vice president of corporate computing for Aberdeen Group, Inc., a consulting firm in Boston, said parallel processing could be a key to users' downsizing efforts if the right products are made available.

Database parallel processing
The capability used to automatically split a database request from a client into discrete components handled simultaneously by multiple processors.

"To some degree, downsizing has been impeded by the fact that mid-range and smaller machines couldn't really support [databases] in the same way as a mainframe does," Kastner said.

Parallel processing capabilities on servers should enable users to downsize while retaining mainframe-like features, such as high performance and support for a large number of users, he added.

NONPARALLEL PATHS

Database vendors are taking two approaches to providing users with parallel processing capabilities. Both Informix and Oracle have integrated parallel technology into their database software, while rival Sybase will support parallel processing in Navigation Server, an adjunct product to its SQL Server database.

See **Parallel**, *page 29*

IBM readies client/server version of image software

ImagePlus pack will run on both OS/2, MVS servers.

BY ADAM GAFFIN

Bethesda, Md.

IBM this month plans to roll out a client/server version of its ImagePlus image management software designed to let customers develop enterprise multimedia and work flow applications.

The software consists of client software that lets users request and view images, as well as server software that locates, stores, retrieves and manages images and files that include images. Servers and clients can be located on one or more local-area networks.

IBM plans within a few weeks to start shipping its ImagePlus VisualInfo software with server software for OS/2 and MVS computers as well as client software for OS/2 machines. By late summer, the company said it would release a server version for AIX platforms, followed by a client for Windows machines.

The software goes beyond the company's existing OS/2-based ImagePlus/2 software, which is meant for users on a single LAN, by relying on a client/server architecture to support larger applications.

The announcement is likely the first of many client/server-based imaging and document management products planned by IBM this year, said Bruce Silver, vice president of BIS Strategic Systems, Inc., a consulting firm in Norwell, Mass. IBM was among the last major imaging companies to begin moving away from mainframe-based imaging products, but its new, scalable architecture for imaging products could make IBM "the No. 1 headache" for competitors, he said.

Company officials said a typical configuration would include multiple Object Servers for storing images, documents and audio/video snippets as objects, as well as a Library Server equipped with a database listing where images are stored on a network. After looking up a user request in its DB/2-based database, the Library Server would then pass it on to the appropriate Object Server, which would then forward the requested file to the user.

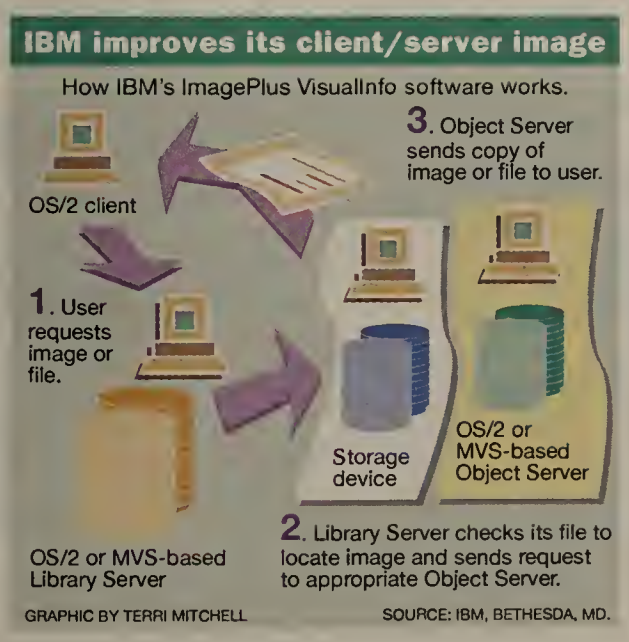
The Library Server will also handle security and work flow functions. The client software will let a user manipulate and annotate files and then forward them to others for action.

ImagePlus VisualInfo software can work on nets running Advanced Program-to-Program Communications and Advanced Peer-to-Peer Networking protocols, and can be accessed across LANs running Novell, Inc.'s NetWare. With IBM's AnyNet connectivity software, the imaging software can also run on nets supporting other protocols, including Transmission Control Protocol/Internet Protocol.

Future releases will add native support for TCP/IP and the Network Basic I/O System, IBM officials said.

IBM expects to charge from $20,000 to $25,000 for OS/2 server software and 10 clients. A comparable MVS setup would cost from $85,000 to $90,000, IBM said. A developers' kit will cost $99.

✆IBM: (301) 803-6000.



BRIEFS

Intersolv of Rockville, Md., last week introduced an **object-oriented development** module for its Excelerator II for Client/Server application development tool set. The Object-Oriented Analysis and Design package will support multiple object-oriented methodologies for users constructing applications. As an extension of Excelerator, it will use the software's client/server repository, which is used to store design data for development teams. Existing Excelerator II for Client/Server customers can buy the object package for $1,000 per user. A new copy of Excelerator with the object module carries a $5,000 per-user fee.

Intersolv: (301) 230-3200.

Marcam Corp. of Newton, Mass., last week said it will use Progress Version 7 development tools from **Progress Software Corp.** of Bedford, Mass., to develop a client/server version of its Prism manufacturing software. The 15-month contract is worth $1.5 million. Prism now works with IBM Application System/400 computers, but Marcam will use the Progress software to develop Prism versions for other platforms.

Progress: (617) 280-4000.

MUST Software International of Norwalk, Conn., last week announced that it had begun shipping a new version of its Nomad fourth-generation language for Hewlett-Packard Co.'s 9000 servers and for other computers running HP-UX. Nomad lets users create applications that can access Sybase, Inc. SQL Servers and Oracle Corp. databases. Prices for the HP-UX version start at $2,500 for a single-user workstation connected to either a Sybase or Oracle server.

MUST: (800) 441-6878.

Network Computing Devices, Inc. (NCD), a Mountain View, Calif., X terminal vendor, last week said it will buy **Z-Code Software Corp.** of Novato, Calif., for $46 million. Z-Code makes Z-Mail, which forms the heart of Silicon Graphics, Inc.'s MultiMedia electronic mail product. Z-Code hopes to ship Windows and Apple Computer, Inc. Macintosh versions by midyear.

NCD: (415) 694-0650.

Walker Interactive Systems, Inc. of San Francisco last week said it shipped the first beta copy of its **client/server financial software** — a general ledger application code-named Redwood — to Reynolds Metals Co. in Richmond, Va. Walker has been a provider of mainframe-based financial applications but is undergoing a transition to support the new computing model. The first release of the Walker software will run on a Hewlett-Packard Co. HP 9000 Series 800 server with a Sybase, Inc. SQL Server database. The firm plans to release client/server versions of other financial applications, including Asset Management, Accounts Payable, Purchase Order, Inventory Management, Project Cost Management, and Credit and Accounts Receivable Management.

Walker: (415) 495-8811.

WORK GROUP COMPUTING

Ashland Chemical boosts help desk with Notes pilot

BY ROSEMARY CAFASSO

Cincinnati

Having completed a pilot of Lotus Development Corp.'s Notes software within its information systems (IS) department, Ashland Chemical Co. is now preparing to deploy the software to end users across the company.

User calls on Notes for help
A case study of Ashland Chemical Co.

Challenge: Improve a primarily manual help desk operation and boost staff morale.

Approach: Install Lotus Development Corp. Notes to automate procedures and better balance work load.

Result: Initial reluctance to move to a shared-file environment has given way to a more efficient help desk operation.

Ashland's IS department first installed Notes in late 1992 without a specific game plan other than to somehow improve operations, said Steve Riley, a systems analyst at the firm. But that hunch about Notes is turning into a full-scale plan to install the work group software on up to 2,000 desktops and establish it as an application development and communications tool for end users.

Ashland is positioning Notes in this role because of the benefits it delivered during a test run with the company's IS help desk operation. The test was not without its ups and downs, but Riley said lessons learned should make for more effective Notes deployment corporatewide.

Ashland's help desk was the perfect test case for Notes. Its six staff members were technically savvy, but they relied on a paper-based call tracking system that was just waiting to be automated.

Notes was installed for this team in early 1993 running on an IBM OS/2 server linked to Windows clients via a Banyan Systems, Inc. VINES local-area network.

After resolving a handful of technical and personnel problems — some users were not initially keen on the work group concept — Ashland proclaimed its Notes test a success. Word about Notes got out, and end users soon started requesting the software for themselves.

"[The end users] had ordered several hundred copies of Notes," Riley said. "We would say, 'It's not that easy. You need to have something in mind to do.'"

Among the lessons learned during the help desk pilot was the benefit of designing easy-to-use Notes applications. The applications initially provided for too much data per electronic form.

"[Users] found they were spending a lot of time navigating around the form," Riley said. "We completely redid the form so you could see everything on one screen."

Riley next tackled Notes performance problems, which cropped up when the product's database grew to about 18M bytes and response time bogged down. He implemented various performance tuning techniques, which included reducing the size of Notes indexes and categories to cut down on data search times.

Ashland also plans to remove the Workplace Shell, the client portion of OS/2, so the IBM software functions only as a server operating system. This should win the database another 4M or 5M bytes, Riley said. The other hurdle Ashland needed to overcome with Notes was a psychological one. While the help desk staffers often felt burdened by the paper-based system, they showed initial resistance to becoming a networked team. With the old system, it was not unusual for a staffer to receive an end-user call, log the request and then search the area for a colleague with the appropriate expertise. With Notes, a request is recorded in real time and then sent to the appropriate team member.

Ashland Chemical Co. is a division of Ashland Oil, Inc., a $10 billion diversified energy company that markets gasoline, distributes industrial plastics, and produces natural gas, crude oil and specialty chemicals.

Despite that improvement, staffers initially did not want to share their information in Notes.

"We found people were reluctant to put information [in Notes] because they were feeling like they weren't necessary anymore," Riley said. "I think they wondered that if they put their knowledge in there, would they be replaced?"

The resistance to Notes slowly melted as help desk staffers' work days improved due to the work group software. Chief among those improvements was the creation of a dispatcher job to accompany the Notes system. This person logs all calls, keeps track of requests and forwards the requests to individuals.

The process not only gave each team member a clearer picture of the work load balance, but it also eliminated the problem of end users calling on their favorite help desk person regardless of the problem. The new dispatch process began to chip away at a sense that jobs were unevenly distributed.

The experiences of the IS department should be beneficial to Ashland's end users when they start using Notes, Riley said. "While it's hard to quantify, [Notes] helps promote a sense of teamwork," he said. "[People] work better because they can communicate effectively."

Start-up unveils set of document mgmt. tools

BY ADAM GAFFIN

Pleasanton, Calif.

Documentum, Inc., founded in 1990 with capital from Xerox Technology Ventures, Inc. and bolstered last year with funds from several venture-capital firms, last week formally introduced its line of enterprise document management tools.

Actual shipment of the company's product line, called Documentum, began last year. But the firm held off on publicizing the products to gather data on how the software was working in production.

DOCUMENTUM

The company's client/server software is designed to help users manage large volumes of documents stored on networked computers, said Robert Reid, vice president of marketing. Documentum will target the government, pharmaceutical and other industries that generate and reuse huge volumes of documents when developing new products, he said.

Key to the system is indexing server software that contains information about the attributes of documents stored anywhere on a net. This information includes the documents' location, file types and revision history. The software uses an object-oriented approach to storing data about individual documents, which lets users create new compound documents from existing ones, Reid said.

Users equipped with client software from Documentum can annotate documents and set rules for forwarding documents when they are done with them. The client software enables end users to query the server database through Documentum's Document Query Language, which is based on the ANSI SQL standard.

The client and server components of Documentum are designed to run over Transmission Control Protocol/Internet Protocol nets.

The server software requires an Oracle Corp. Oracle6 or 7.X database sitting on a Unix server running HP-UX or Sun Microsystems, Inc. Solaris 2.X or SunOS.

Server versions for AIX and Windows NT are expected in the second quarter. A Sybase, Inc. System 10 version is expected in the second half of 1994.

Client software is available for Windows and Apple Computer, Inc. Macintosh platforms, as well as for Unix systems running Motif and SunOS or Solaris 2.3. A Windows NT version is expected by July.

Bruce Silver, vice president of BIS Strategic Decisions, a consulting firm in Norwell, Mass., said the fact that the company was able to formally launch its product with a sizable number of customers in place — roughly 50 — bodes well for its future.

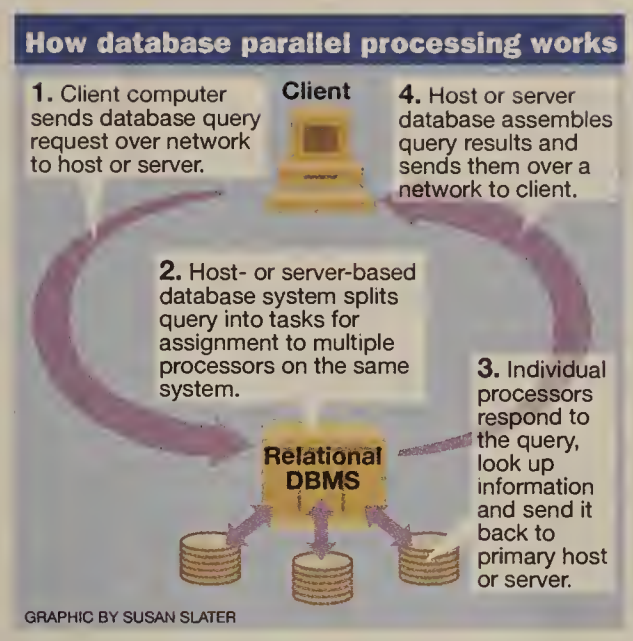
The Documentum software costs about $45,000 for a basic 32-user configuration.

✆Documentum: (510) 463-6800.

Parallel

Continued from page 27

Oracle and Informix cited performance considerations as the reason they have put parallel processing code into the database kernel. This closely coupled approach is designed to eliminate any communications problems or net traffic associated with distributing the parallel processing and core database functions.



Sybase officials argued that building parallel processing into an adjunct product will result in superior performance compared to when the technology is included in the core database system. Sybase's Navigation Server will isolate the database engine from parallel processing overhead, task splitting and management.

"Our architecture is inherently more capable of servicing a large number of users and doing so with dramatic improvements in performance," compared with building the technology into the core database, said Malcom Colton, director of server product marketing for Sybase. "In the next few years, parallel processing will take on a central role in corporate client/server computing."

Building parallel processing technology into an adjunct system can also provide net managers with more flexibility than the integrated approach, Colton said. For example, a user could station an SQL Server database in one location and run Navigation Server in another to make the best use of computing resources.

Done correctly, parallel processing in database environments can boost performance.

When Oracle announced the Parallel Query Option for the Oracle Version 7.1 database in September, it cited a customer in the banking industry who used the technology to cut processing time for complex quarterly report queries from 24 hours to 10 minutes.

Similar claims were made by Informix when it announced a parallel processing capability in November.

Parallel query and index building are the first parallel processing technologies implemented by database vendors. These queries let users answer to ad hoc queries that were previously too processor-intensive to run in a net environment. Index building involves creating indexes that speed up subsequent queries.

Parallel database updates and joins will be among the other parallel processing applications users can expect to see down the road.

Editorial

I've been fascinated of late reading *Strategy,* B.H. Liddell Hart's bible on military strategy (Penguin Books USA, Inc., N.Y.). From Alexander to Eisenhower, Hart explores the strategic thinking or blundering that lay behind the greatest victories and defeats.

There's a tendency to view all competition, war included, simplistically — to equate raw power and resources with superiority and victory. But *Strategy* makes clear that those elements aren't the linchpin in success. Many of the worst defeats resulted from misapplication of superior forces.

Hart's message: The route to victory is an indirect one. The key to strategy is not to smash headlong into your opponent's stronghold but to cause disruption by directing your forces against unfortified positions. In short, to seek maximum gain from the most economical use of resources.

Napoleon was a master of the indirect approach until, ironically, his forces and influence swelled, and he squandered his empire.

Why is this peace-loving editor sounding themes of war and conquest? Because Hart's dictum holds true across the board. "The indirect approach...is a law of life," he wrote.

Your mission is to apply technology and human resources to get the greatest business gain. But to achieve that end, you have to know your competitor's position and "hit it where they ain't," as it were. Too often, companies try to match a competitor's successes. The result: maximum expenditure of resources for minimal gain. Better to figure out where your enemy is weak and move on that front.

Here's a theoretical example. Your competitor invests in an innovative order-entry system and steals market share. The knee-jerk reaction is to try to leapfrog that effort. Worse, you might become paralyzed because you don't have the resources to match or outdo the opponent.

While you can't ignore the order-entry advantage, it's better to seek a less contested battleground. If the competitor is weak in customer service, for example, an investment — even a much smaller one — in that area would do more to win customer loyalty than trying to take the fortified high ground.

To formulate strategy, you have to know the competitor's business inside and out. Once you've done that homework, apply Hart's wisdom of indirect approach. You can even use it to sell your ideas internally because, as Hart wrote, "The direct assault of new ideas provokes a stubborn resistance."

➸JOHN GALLANT jgallant@world.std.com

TELETOONS

FRANK AND TROISE

PUBLIC NETWORKING

by Mary Johnston Turner

Assessing new alliances will be key to users' success

The new alliances and partnerships being formed among major industry players will change the way network managers do business with public service providers. Increasingly, net managers will not evaluate just one carrier vs. another but will have to consider the relative benefits and weaknesses of working with one set of alliance partners vs. another.

In recent months the headlines have been full of alliance and equity investment deals involving interexchange carriers, regional Bell holding companies, PTTs and CATV companies. For example, new legislation now under consideration will give RBHCs more freedom to own cable systems, provide long distance services and team with information-content providers like on-line database publishers and entertainment program producers. Deals such as US West, Inc.'s investment in Time Warner, Inc. and Bell Atlantic Corp.'s investment in Tele-Communications, Inc. will integrate extensive telephone company and CATV plants across the country.

BT's investment in MCI Communications Corp. points to the creation of a single mega-global interexchange carrier capable of supporting a multinational corporation's service and support needs using a common set of facilities and service software. And AT&T's alliance with France Telecom and Deutsche Bundespost Telekom, while not involving equity investment, points to a similar effort at codevelopment of features and seamless connectivity between carrier services.

The only thing missing has been an alliance between a carrier and a major computing systems or systems integration vendor. BT's failed negotiations with Electronic Data Systems Corp. in 1993 are an indication of activity on that level as well.

Clearly carriers are lining up into powerful alliances and consortiums which will, more than ever before, invest in jointly developed network strategies and bring more comprehensive offerings to the market. These new alliances will significantly complicate the network manager's job, as assessment of new service will now include not only an evaluation of the primary carrier's abilities but a reading on how well the alliance partners can hold up their end. Understanding how well the entire alliance will be able to support your needs is critical.

Traditionally, carriers have been unable to add real value to the data world. Instead, for most of the last decade, the public carriers have been the primary source for intelligent voice networks.

Data services, by comparison, have been relatively unintelligent. Net managers purchase private lines and/or basic transport services, such as frame relay and Switched Multimegabit Data Service, with limited SNMP error-reporting management but no sophisticated bandwidth provisioning or configuration management capabilities similar to voice. The real smarts in data services have continued to be supplied by routers and hubs, and related premises gear.

As the ground rules change, the way managers think about buying carrier services needs to shift as well. The merger and consolidation of the industry's major players will result in greater concentrations of capital in the hands of fewer players who will have to try even harder to get your business. Consolidation of physical telephone company and cable plant may drive down total costs by elimating duplicate infrastructure. Entertainment dollars may accelerate deployment of broadband facilities in areas where telephone companies and cable companies team. Carrier services will become more and more intelligent, customized and transparent across geographies.

In general, carriers and particularly the RBHCs, are likely to use their new alliance partners to generate widely different products and services. After years of increasingly dog-eat-dog price competition among essentially identical services, it's time for them to compete on innovation. Look for strategic partnerships with computer and systems vendors to round out these emerging alliances. Depending on the many partners involved, one group may focus on client/server integration and connectivity services, while another targets advanced multimedia information distribution and conferencing services.

For managers who have grown comfortable dealing with certain carriers, this convergence of telecommunications, computing and entertainment providers signals a need to reexamine strategic carrier relations the next time your bulk contracts come up for renewal. Several questions need to be carefully considered, such as:

- Over the next five years, how is my company likely to change the way we use public network services? Are we looking for different capabilities than we did in the early 1990s?
- Will the introduction of client/server and multimedia within my enterprise change the nature of our wide-area network needs?
- Do I expect intelligent virtual data services to take more traffic and allow my company to deemphasize internal, private networks?
- Which set of alliance partners, rather than which single vendor, can best satisfy my company's future requirements?
- How stable is the alliance or partnership for the time of my next contract? Who will make sure my company is taken care of if the alliance falls apart?
- Is my company's business becoming more global? Which set of vendors has the best geographic coverage given our needs?

Buying into a long-term strategy that must be implemented by multiple parties requires complex contracts to protect your interests. If your company is one of the early entrants into these types of arrangements, make sure that it's clear who is accountable for what and that your end-to-end quality of service is guaranteed. Push for penalty clauses that will force the partners to work together in your best interests.

During the next few years, user companies will not only be creating new types of internal applications such as client/server and multimedia, but will also be looking for new types of sophisticated public services to support evolving networking needs. The company's success will depend on the net manager's ability to assess these new alliances and select the one that can best help the company achieve its goals.

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DOWNSIZING

by James Carlini

Wrong management style for rightsizing

Despite the preaching of *Theory Z*, *In Search of Excellence*, Total Quality Management and other pop management philosophies and styles that corporations have embraced over the years, many network executives still do not have a clue when it comes to managing their most important resource — people. This is evident from the way in which some large corporations have mishandled downsizing/rightsizing endeavors, many of which have resulted in no productivity gains.

You would think that with all the money some network executives spend on pop management books and advanced management education — such as M.B.A.s, executive programs at prestigious schools, seminars at classy resorts and workshops held on tropical islands — they would have learned something about how to handle sensitive employee situations.

Instead, some chief executive officers and their staffs have botched their downsizing endeavors by resorting to tactics reserved for the KGB. It has gotten to the point where their companies have lost face not only with current and former employees, but also with outsiders viewing the internal bloodlettings.

Companies that had sterling reputations and were hailed by industry analysts as being the best in their class are now looked down upon by many. Those who are looking down include former long-term employees that would have defended the firms vigorously to outside criticism until they were treated like common criminals when their jobs were eliminated due to downsizing.

One regional Bell holding company that is well known — through self-promotion — for its corporate compassion and community giving engaged in the cold-hearted practice of calling people to a conference room and telling them that their services were no longer needed.

Even colder, the RBHC was known to tell these employees they would be immediately escorted to the door and their personal belongings would be put into a box and shipped to them.

After all, these were longtime, loyal employees — not Christmas help caught stealing merchandise.

How far have we come in leading people? Have we regressed?

Take some time to reflect on your own managerial and leadership skills. Remember the Golden Rule? Do unto others as you would have them do unto you.

Corny, isn't it? Just as corny as going for the Malcolm Baldrige Award or instituting Total Quality Management practices or some rah-rah program that "empowers" workers without giving them any real incentive.

Don't pay lip service to all these fad management styles and then implement some prison-warden approach.

What we need are some good old-fashioned leaders who earn the respect of their subordinates through positive examples and shared recognition when the job gets done right.

You may think you are some big corporate executive with leadership skills, credentials and charisma.

But if you managed a downsizing with a coldness rivaling an Antarctic winter, you qualify to be a contender for the ABE Award.

What's the ABE Award? ABE stands for Antarctic Barbaric Executive and exemplifies the cold, thoughtless process used by some executives in their endeavors to make their company lean and mean in everyday management (or is that mismanagement?) of their enterprise.

The ABE Award goes to the ruthless, arrogant egomaniac who is so preoccupied with his or her own legacy and grandeur that he or she is blind to the contributions and sacrifices made by everyone else in the organization.

The network executive who gets his organization up and running by solid values and positive leadership will steamroll those who are too self-centered or on the corporate jet contemplating that golden parachute to the next assignment.

Who should get an ABE Award? I have a list of strong candidates. Don't you?

Carlini is president of Carlini & Associates, Inc., a strategic information technologies consulting firm in Hinsdale, Ill. He can be reached at (708) 986-1888.

Letters

PC hard line

Regarding Chuck Gibbons' letter about PC-ism (Jan. 10, page 77) — just when we've about eliminated the old mainframe attitude of, "The PC is just a toy," here come the macho "Give me a command line or give me death" PC hard-liners.

I'm glad to see that Mr. Gibbons has enough of his work time allocated to training his users on each character-based application's unique interface that they can effectively use these "real" computers. As for my organization, we've found that it's much more effective to train users in the Windows interface and let them use their skills across several applications. I would assume, however, that since Mr. Gibbons doesn't like figuring out "what those little pictures are supposed to be" and "directing that little arrow to the right picture," he wouldn't consider an 80X86-based system running Windows to be any more a "real" computer than a Macintosh.

It's also disappointing to see that Mr. Gibbons' knowledge of the Macintosh is so limited that he blindly assumes that AppleWorks is the only application available for it. If his "first-time users" can't deal with AppleWorks, maybe they should try Microsoft Corp.'s Word or Excel, WordPerfect Corp.'s WordPerfect or Lotus Development Corp.'s 1-2-3, all of which have Macintosh versions.

My response to Mr. Gibbons and his command line hardliner fans is simple: The office applications market is trending away from character-based applications, so you might want to start brushing up your graphical user interface skills. Second, while I respect my employer's decision to run Windows on 80X86-based platforms, when it's my money on the line, I'm buying another Macintosh.

John Bykowski
Information systems manager
Investors Management Group, Ltd.
Des Moines, Iowa

Mac not a toy

After reading Chuck Gibbons' letter, I had to respond.

Mr. Gibbons is one of those old-fashioned computer users who thinks that the Macintosh is a toy. Nothing could be further from the truth. Real computing should be judged by the throughput — that is, how much work is actually performed by a user in a particular length of time.

Mr. Gibbons should visit the computer labs at Madonna College in Livonia, Mich. The Macintosh lab is usually very quiet while students perform their work on Macintoshes. Occasionally, students will have a question for the lab aides about how to use some esoteric feature (usually in Microsoft Word), but usually the students just go about their business quietly and efficiency.

In contrast to the above is the DOS-based lab, where the poor lab aides are constantly answering a barrage of questions from exasperated users. A high level of frustration can also be discerned on many student faces in the DOS lab.

Of course, Mr. Gibbons will say that the DOS users are not experts like he is and that is why they are having difficulties. But it should be noted that the Mac users are not computer experts, either, but they can quickly learn to use the Mac to perform useful work. Needless to say, the throughput per student is much greater in the Mac lab.

One last thing — it should be quite apparent which is the superior system — graphical user interface or DOS. Have you noticed how the IBM world of computing is shifting toward Windows? You may have also noticed that the Mac world is not rushing to implement a command line.

Garry Kaluzny
Canton, Mich.

See **Letters**, *page 52*

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Buyer's guide

Frame relay grows up

More mature services ease selection process.

By CHRIS FINN and CHRIS HECKART

After a turbulent two-year roller coaster ride, frame relay services have finally begun to smooth out. With more mature switching platforms in place and a couple years of experience under their belts, carriers have overcome early problems with physical network infrastructure, congestion management and support services.

Based on this progress, it is now easier for network managers to select basic frame relay transport services. Skeptical at first, net managers are today finding frame relay is the best or only option for local-area network interconnection and data network consolidation.

"The service works as advertised," says Thomas Martin, manager of communications and operations of Lithonia Lighting in Conyers, Ga. "It quite simply fulfills my business needs."

Instead of focusing on whether frame relay can do the job, net managers can feel confident in installing it now while they concoct a migration strategy to higher speed services such Asynchronous Transfer Mode (ATM). To make their frame relay selections, net managers must wade through a confusing pricing structure and a set of feature-rich service options carriers are now rolling out.

While carriers have been more forthcoming about quoting prices than just a year ago, it is still very difficult to make an apples-to-apples comparison. Each carrier has put its own twist on frame relay pricing, charging differently for access circuits and permanent virtual circuits (PVC) that mimic operation of a leased line. Carriers also offer a mix of committed information rates (CIR) — a form of performance guarantee — on a fixed or usage basis.

Other major factors to consider in evaluating frame relay include emergence of such options as switched virtual circuits (SVC) that mimic operation of a dial-up line, new forms of frame relay access, disaster recovery and stronger network management options.

Other important considerations include the carrier's willingness to provide customer premises equipment under a mix of financial terms and its expertise in accommodating particular network applications such as IBM System Network Architecture networking (see story, page 35).

There are essentially two broad types of service offerings: a premium service that is national and global in scope and one that has more of a local/regional flair.

Interexchange carriers offer premium services that provide connectivity throughout North America and to most global business centers. They also include a plethora of different configuration and support options, such as turnkey outsourcing in which the carrier runs the entire frame relay network for that customer, and a wide range of speeds.

All seven of the regional Bell holding companies and a handful of regional carriers such as EMI Communications Corp. and PacNet, Inc. now offer some level of frame relay service. These services are generally simpler in scope than interexchange offerings, providing fewer speeds and options.

However, net managers can mix and match service providers in a single logical network as long as the carriers have implemented the frame relay network-to-network interface (NNI), a standard for interconnecting separate frame relay networks. Ameritech, PacNet, NYNEX Corp. and US West Communications, Inc. currently support the NNI. AT&T, Southwestern Bell Corp., Sprint Corp. and WilTel will support NNI this year.

As a rule of thumb, three locations within a metropolitan area makes a company a candidate for local frame relay. Otherwise, an interexchange service is better (see story, page 35).

FRAME RELAY: THE PATH TO ATM?

Both forms of frame relay service offer much the same scalability, flexibility, simplified network management, consolidated network architectures and cost-effective connectivity that ATM promises. Yet, many bandwidth hungry customers that will eventually migrate to ATM shy away from frame relay for fear of technology obsolescence.

"They are missing the boat," says Jim Fey, director of strategic technology at PMI Mortgage Insurance Co. in San Francisco. "This is not an either/or situation," he says. Frame relay can be used comfortably today because carriers are laying out plans to interconnect frame relay into their ATM backbones.

Fey has been utilizing frame relay for nearly two years, choosing the technology to improve connectivity, reduce cost and improve performance for the mission-critical data applications running across the company's enterprise network. He recognizes the need for a smooth migration path between frame relay and ATM, which requires carriers to support a transparent protocol conversion that will enable frame relay traffic entering the carrier network to ride across the public ATM backbone.

All major carriers have painted such a picture of the future. The carriers say they will provide a multiprotocol broadband backbone with complete service interoperability. Such a backbone will accomplish two things: It will provide an insurance policy to users waiting for ATM and ensures investment in frame relay will not be wasted.

Carriers are beginning to describe this backbone as one that consists of a cell-relay switching fabric that utilizes T-3 — and eventually Synchronous Optical Network — backbone facilities. A mix of interface protocols such as frame relay, ATM or even Switched Multimegabit Data Services can be used to access this backbone, and conver-

Continued on page 35

1994 NETWORK WORLD SHORT LIST

Frame relay services

- ✓ **MCI Communications Corp.** *HyperStream Frame Relay*
- ✓ **Sprint Corp.** *Sprint Frame Relay Service*
- ✓ **US West Communications, Inc.** *Frame Relay Service*
- ✓ **WilTel** *WilPak*

Complete details about The Short List appear on page 34.

INSIDE

Frame relay services

Company	Service	CPE provided (B = Bridges C = CSUs R = Routers)	CPE financing (C = Carrier financing L = Leasing P = Purchase option)	Oversubscription: Percent allowed	Bursting: Up to access speed	Bursting: Up to port speed	Bursting: Duration (seconds)	Paper reports (R = Raw traffic statistics S = Statistics on frames marked "Discard Eligible" T = Traffic by location U = Utilization by PVC)	On-line mgmt.: SNMP	On-line mgmt.: Terminal	POPs	Gateways (A = ATM S = SNA T = TCP/IP X = X.25 O = Other)	Extended capabilities: International availability (no. of countries)	Extended capabilities: Integrated access	Extended capabilities: Disaster recovery	Port speeds (bit/sec) and monthly cost: 56K/64K	112K/128K	256K	384K	512K	768K	1.024M	1.536M	CIR: Zero	CIR: Incremental	CIR: Port speed	CIR: Usage-based pricing	CIR: Fixed price
Ameritech (800) 832-6328	Ameritech Frame Relay Service	B, C, R	C, L, P		✔	✔	4		✔		9					ICB			ICB				ICB			✔		✔
AT&T (800) 248-3632	AT&T InterSpan Frame Relay Service	C, R	C, L, P	200		✔	(1)	R, T, U	✔	✔	200+	A, S, T, X	17	✔		(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)		✔			✔
Bell Atlantic Corp. (800) 422-0455	Bell Atlantic Frame Relay Service	B, C, R	L, P	200		(3)	1	R, S, T	✔	✔	11				✔	$175							$435		✔	✔		✔
BellSouth Telecommunications, Inc. (404) 529-6757	Frame Relay			200							6				✔	$170-$210							$600-$800					✔
BT North America, Inc. (800) 872-7654	GNS LAN Interconnect	B, C, R	L	200	✔		(1)	R, T, U	✔		40	T, X	14		✔	$400		$750		$1,400		$2,100	$2,300		✔			✔
Cable & Wireless Communications, Inc. (703) 790-5300	LAN Connect	C, R	L	200		✔	(1)	S, T, U			110		2	✔	✔	$145	$175	$190	$400	$900	$1,100	$1,400	ICB		✔	✔		✔
CompuServe, Inc. (800) 433-0389	Frame-Net	C, R	L			(4)	(1)	R, T, U	✔		98		8	✔	✔	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)		✔	✔		✔
EMI Communications Corp. (800) 456-2001	EMI-Frame Relay	C, R	C, L, P	200	✔	✔	(1)	R, S, T, U			18			✔	✔	$120				$590		$987			✔	✔		✔
MCI Communications Corp. (800) 933-9029	HyperStream Frame Relay	B, C, R	C, L, P			✔	(1)	R, S, T, U	✔		391		3	✔	✔	$180	$330	$400	$600	$750	$950	$1,200	$1,600	✔	✔	✔	✔	✔
NYNEX Corp. (914) 644-5470	NYNEX Frame Relay Service	C	L					R	✔		63	T		✔	✔	$53-$67			$256-$350				$769 - $985			✔		✔
Pacific Bell (510) 901-6498	Frame Relay Service	B, C, R				✔		R, S, T, U			4				✔	$75	$150		$400				$500		✔			
PacNet, Inc. (206) 232-9900	Paklink			400	✔		(1)	R, S, T, U	✔		12	A, S, T	5	✔	✔	$24-$350	$75-$440	$104-$520	$320-$675	$340-$800	$427-$975	$535-$1,175	$668-$1,475			✔		✔
Southwestern Bell Corp. (800) 992-2355	Frame Relay Service	B, C, R	C, L, P	(1)				R, S, T, U			16	X		✔	✔	$164			$295				$575			✔		✔
Sprint Corp. (800) 877-4646	Sprint Frame Relay Service	B, C, R	C, L, P	100	✔		1	R, S, T, U		✔	330	S, T, X	14	✔	✔	$160	$275	$440	$660	$825	$1,045	$1,375	$1,800	✔	✔	✔	✔	✔
US West Communications, Inc. (800) 328-2879	Frame Relay Service	B, C, R	P	200	✔		1	R, S, T, U	✔		75	X, O		✔	✔	$99-$286							$347-$784	✔	✔	✔		✔
WilTel (800) 364-5113	WilPak	B, C, R	C, L, P	200		✔	(1)	R, T, U	✔	✔	175	A	4	✔	✔	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)		✔	✔		✔

Products highlighted by color were selected for The Short List.

FOOTNOTES:
(1) Determined by customer application and traffic volume.
(2) Carrier declined to give pricing.
(3) Up to CIR.
(4) Up to 150% of port speed.

ATM = Asynchronous Transfer Mode
ICB = Individual case basis
CIR = Committed information rate
CPE = Customer premises equipment
CSU = Channel service unit
POP = Point of presence
PVC = Permanent virtual circuit

Chart compiled by Cheri Paquet

The Short List:

Frame relay services

The Short List highlights products Network World *recommends you examine during the purchasing process for frame relay services. The services included in The Short List offer the best mix of low price, service functionality, features and support — the key criteria used for selecting a service provider. Some offer additional useful features. The criteria used for selection to The Short List reflect the needs of users with multivendor enterprise networks. Your criteria may differ based on network configuration and application needs.*

■ MCI Communications Corp.
HyperStream Frame Relay

MCI's HyperStream Frame Relay service offers all the important service features, including a broad mix of speeds, disaster recovery and integrated access. MCI differentiates itself by offering the most innovative pricing options of any frame relay service. These pricing options include a distance-sensitive permanent virtual circuit that can keep costs for connecting nearby sites down. In addition, the carrier has impressive geographic coverage with 391 domestic points of presence (POP) and service to 12 countries. Network management options include everything from paper reports to a fully configured Simple Network Management Protocol-based management system.

■ Sprint Corp.
Sprint Frame Relay Service

What sets Sprint apart is its pioneering of usage-based pricing and a zero committed information rate (CIR) service. Usage-based pricing makes it affordable to add low-volume sites to a frame relay network, while zero CIR eliminates the need to pay extra for guaranteed bandwidth. Sprint also has a wealth of experience in public data networking and has integrated its X.25, Internet Protocol and frame relay networks. The carrier offers service from 330 domestic POPs and 14 foreign countries.

■ US West Communications, Inc.
Frame Relay Service

US West Communications has undoubtedly been the most aggressive local exchange carrier (LEC) in the deployment of frame relay with availability from 75 POPs. Like the other LECs, US West Communications has endeavored to keep pricing simple by taking such steps as offering a zero CIR. But US West Communications has also developed management reporting and offers excellent service support. The carrier has also implemented the frame relay net-to-net interface, which enables it to pass local frame relay traffic to a long-haul carrier.

■ WilTel
WilPak

WilTel was the first carrier to offer a commercially available frame relay service. One of WilTel's strongest points is its fully mature network, which has enabled the carrier to offer users the ability to define a maximum sustained burst rate. WilTel also plans to be among the first carriers to enable frame relay to ride over an Asynchronous Transfer Mode backbone. The carrier offers a full line of internetworking support services, including hardware and management. WilPak customers have several options for traffic management that are facilitated by StrataCom, Inc.'s Foresight software running on WilTel's StrataCom IPX switching platforms.

Making SNA a snap

Thanks to advancements in router technology, carriers have been able to make some headway in their attempts to position frame relay as an attractive alternative to leased lines for carrying delay-sensitive IBM Systems Network Architecture traffic.

Router vendors such as Cisco Systems, Inc., CrossCom Corp. and Wellfleet Communications, Inc. have added SNA support options to their equipment. This enables AT&T, MCI Communications Corp., Sprint Corp, WilTel and other carriers to ship SNA traffic coming from those routers alongside the more bursty, delay-tolerant local-area network traffic that frame relay was originally designed to handle.

Routers get SNA traffic ready for shipment over frame relay networks using at least one of three techniques.

One method is to support source route bridging (SRB). In this scenario, routers convert Synchronous Data Link Control packets into Logical Link Control 2 (LLC2) packets. This approach is well suited for linking token-ring environments into a frame relay network. Converting SDLC to LLC2 also preserves traditional SNA network management by enabling IBM's NetView to view diagnostic data.

While suitable for small networks, SDLC-to-LLC2 conversion becomes less than ideal in large, high-volume networks because of the SNA polling overhead — caused by the ability of LLC2 to carry host-to-terminal polls — that must traverse the wide-area network. Another drawback comes in the area of network recovery and overall distance limitations.

It takes quite sometime for SRB to recover from link failures because each SRB device must undertake the entire network discovery process again by sending out and responding to discovery packets. Likewise, IBM's recommendation that there be no more than seven SRB nodes between sending and receiving workstations limits how far an LLC2 packet can be sent through a frame relay network.

For melding larger SNA nets into frame relay, the second option in which routers perform SDLC tunneling becomes viable. In this environment, SDLC is encapsulated into Transmission Control Protocol/Internet Protocol packets by the router prior to being forwarded onto the frame relay net. While response to network failures is not as troublesome as in the SRB environment, network management functionality is lost because SDLC packets encapsulated in TCP/IP cannot be seen by NetView.

Other SNA characteristics, such as priority levels and service classes, are also ignored in the encapsulation scenario. Traffic in this environment is also increased because SNA polls wrapped in TCP/IP are passed across the frame relay net.

Multiprotocol routers that offer a combination of SRB and encapsulation may provide the best alternative. In this approach, SDLC is first converted to LLC2, then encapsulated into TCP/IP. Doing so allows the packet to be routed instead of bridged, which provides for automatic link recovery from failure.

This approach can cut down on the amount of polling traffic traveling across the network through the use of spoofing. The spoofing technique enables the router receiving data from an SNA device to send out an SNA acknowledgment that fools the sending device into believing the host has responded.

Finally, there are routers that support IBM's Advanced Peer-to-Peer Networking (APPN) architecture, which provides standard class of service and prioritization for SNA applications in native form. However, while APPN may be the way of the future for many true-Blue networks, it also may require host-based VTAM and front-end processor-resident Network Control Program upgrades.

"We had to make a decision," says Steve Engel, network engineer at Minnesota Mutual Life Insurance Co. in St. Paul, Minn. "I could support both LAN and SNA traffic together or continue to operate my [9.6K bit/sec] multidrop network for about the same monthly cost. It turned out to be totally painless."

Minnesota Mutual chose AT&T's InterSpan frame relay service and has over 20 locations on the network.

C. Heckart

Continued from page 33

sion routines will enable traffic from a site using one interface protocol to communicate with a site using another. For instance, one site will send frame relay to the carrier for delivery as ATM traffic to another site.

This interoperability will allow carriers to provide connectivity to locations requiring anywhere from 64K to 45M bit/sec over a single network with a single management system. The ability of carriers to deliver on this promise is a matter of timing. Each carrier will achieve this goal with different network platforms, different service packages and features, and via a different service strategy.

Sprint already offers connectivity across its Internet Protocol, frame relay and X.25 networks. A single network platform supports multiple interfaces and gateway devices to provide the protocol translation. ATM integration is planned by 1994.

AT&T has laid out a similar strategy. WilTel is deploying an integrated broadband network with its High-Speed LAN Service already supporting ATM at 1.536M bit/sec.

PRICING

While the carriers seem to be in agreement that they will fold frame relay into an integrated backbone, there is a very striking contrast in how they price their frame relay services. And now that frame relay services are operating more smoothly, an evaluation of carrier pricing strategies becomes paramount in the selection process.

Frame relay prices are generally based on the provision of the following components: an access line that may also be used to provide a link to other carrier services, a port connection fee for hooking into the serving carrier's frame relay switch and PVC charges that are based on CIR — or guaranteed minimum speed.

To throw a monkey wrench into what appears to be a somewhat understandable pricing plan: Some carriers cover the cost of a single PVC or multiple PVCs in the port connection charge, while others impose an additional fee for each PVC on top of the port connection price. PVCs are used to establish a predefined path that traffic from one site on the network must take to another site.

Similar to how virtual circuits work in the X.25 world, a single frame relay access line can support multiple PVCs. The carrier switch examines incoming traffic to learn the PVC number and thus ascertain which predefined path must be taken to reach the destination.

To make matters worse, there is most always a charge for CIR on each PVC.

Some carriers also offer a hierarchy of extra cost options such as assistance with network configuration, equipment packages and outsourcing.

Some carriers, such as CompuServe, Inc. and BT North America, Inc., bundle the cost of the local exchange carrier lines needed to access their frame relay switches into the port connection fee. Other carriers, such as AT&T, MCI Communications Corp., Sprint and WilTel pass along the local access charges they incur in order to link the customer to their nearest point of presence (POP).

The difference is that the carriers who bundle local carrier access charges into the port connection fee usually charge more for a frame relay network connection, but that price is not mileage sensitive. Other carriers price access lines according to mileage, which opens the door for having access at one site cost more than access at another site.

Many carriers that charge separately for access are starting to offer volume discounts. MCI, for example, has its Access Pricing Plan, which trims access line costs in exchange for an agreement to have access at a specified number of sites over an agreed-upon length of time.

Another option offered by the likes of AT&T, MCI and Sprint is integrated T-1 access, which allows net managers to make use of currently installed T-1s for frame relay. Integrated access allows each of the 24 channels on a T-1 to be assigned to services individually.

Carriers that offer a wide array of voice and data services are more likely than others to offer integrated T-1 access, and there is really no difference in how it works (see graphic, page 38).

Other carriers, such as BT and CompuServe, can provide integrated access to their frame relay, value-added network and other data services. WilTel can provide integrated T-1 access to its frame relay, private-line and voice services, although its voice services are more limited than those of other carriers.

Integrating voice, private-line and frame relay over the same local access facilities can save money. However, these savings should be balanced with concerns for single points of network failure. For some network sites or applications, the use of separate voice and data network access can provide an added measure of redundancy.

Virtually all carriers have a fixed charge for a port connection. This component is often the single most costly element. Port charges vary by speed and are often based on CIR. Interexchange carriers typically offer a whole range of speeds, from 56K bit/sec up to T-1. In order to keep their services a bit more simple, RBHCs offer a far more limited set of speeds, typically just 56K bit/sec, 384K bit/sec and T-1.

Access and port connection fees are fairly straightforward, but PVC and CIR pricing is not. Generally, RBHCs include a set amount of PVCs in their port connection fee, which partially accounts for the price range for RBHC

Continued on page 38

Choosing between local and long-haul

With frame relay switches popping up in central offices across the country and around the globe, network managers are finding it a tad difficult to decide when to use one type of carrier over another. But there are some general rules that can help make that selection easier.

On the local or regional level, users have the option of choosing a local exchange carrier or small, regional carrier. The most basic advantage here is that these carriers offer more dense coverage within the geographic area they serve than national carriers do so prices are lower, and the networks may offer more redundancy.

Regional carriers such as PacNet, Inc. and EMI Communications Corp. have stated that their goal is to have at least one frame relay switch per local access and transport area in their respective regions. These carriers can use the network-to-network interface (NNI) to provide a link to national carriers' frame relay networks.

Regional Bell holding companies provide an alternative for frame relay among LATA sites. These local carriers also plan to use NNI to tap long-haul carriers for inter-LATA frame relay traffic.

As a rule of thumb, companies that have the bulk of their sites concentrated within one LATA will be better off using a local carrier's public frame relay service and employing leased lines to the few sites outside the local area, says Joseph Zell, director of service development at US West Communications, Inc.

Zell says companies with one or two sites in a number of cities will be better off using a national public frame relay service. Companies with a number of offices concentrated in a few key cities as well as single sites scattered across the country have another option. These companies can use local public frame relay service in the cities with multiple sites and an NNI gateway to a national provider that can reach the others.

On the other side of the coin, national service providers have made their networks more global. AT&T now serves 17 countries, while Sprint Corp. and BT North America, Inc. offer frame relay service to 14 countries each.

Currently, most international frame relay connections are extensions of U.S. networks. One point to note is that many users have experienced mixed results with transcontinental frame relay links.

"There is a certain amount of propagation delay inherent to a 6,000-mile connection, which mitigates performance," says Ray Kang, senior manager of data services at MCI Communications Corp.

Of course, the ability to provide global support will be an issue when choosing a global service. Carriers with backgrounds in the value-added network (VAN) arena, such as CompuServe, Inc., look to leverage their strengths and experience in traditional VAN markets when supporting international frame relay locations.

C. Finn and C. Heckart

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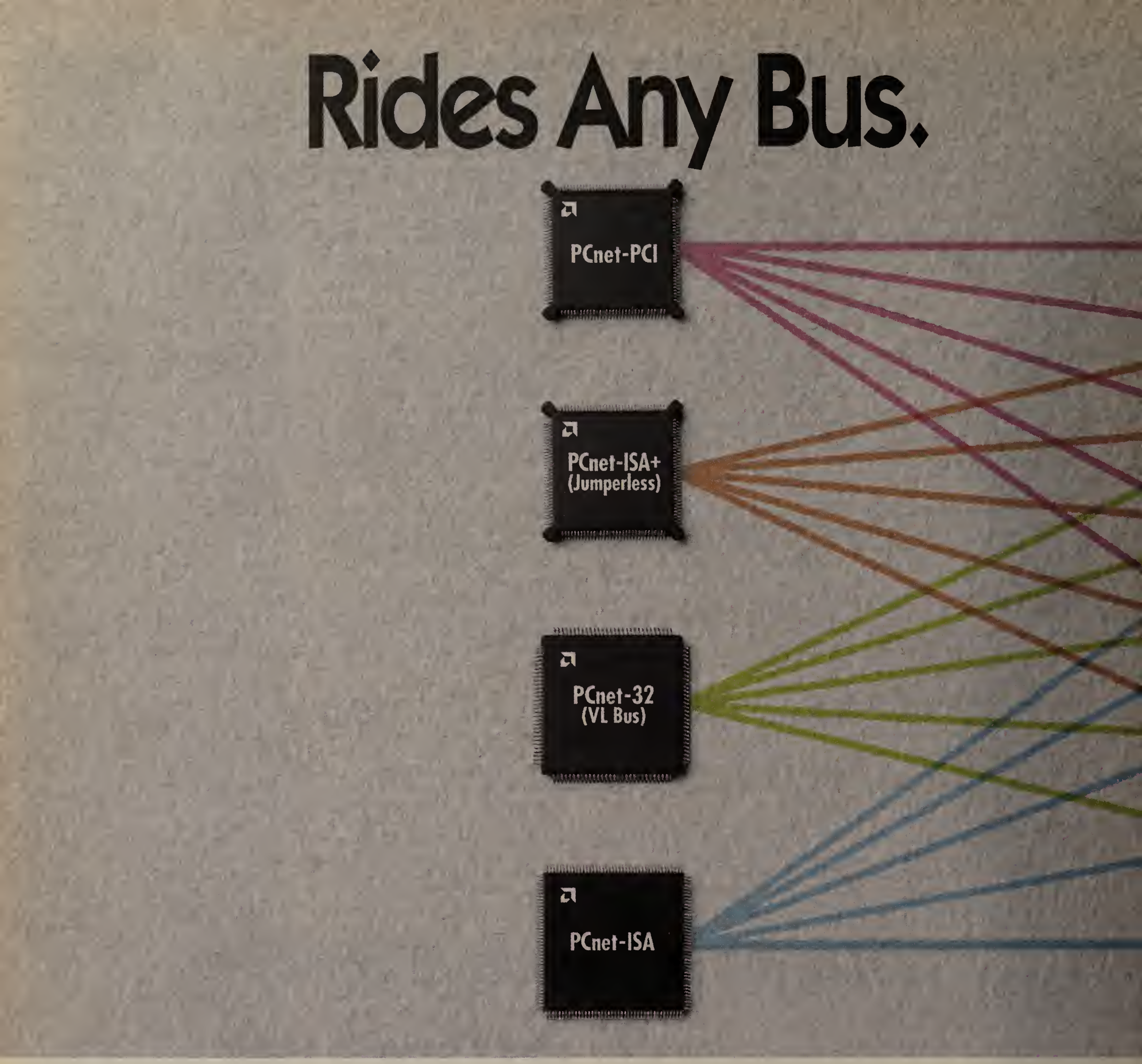

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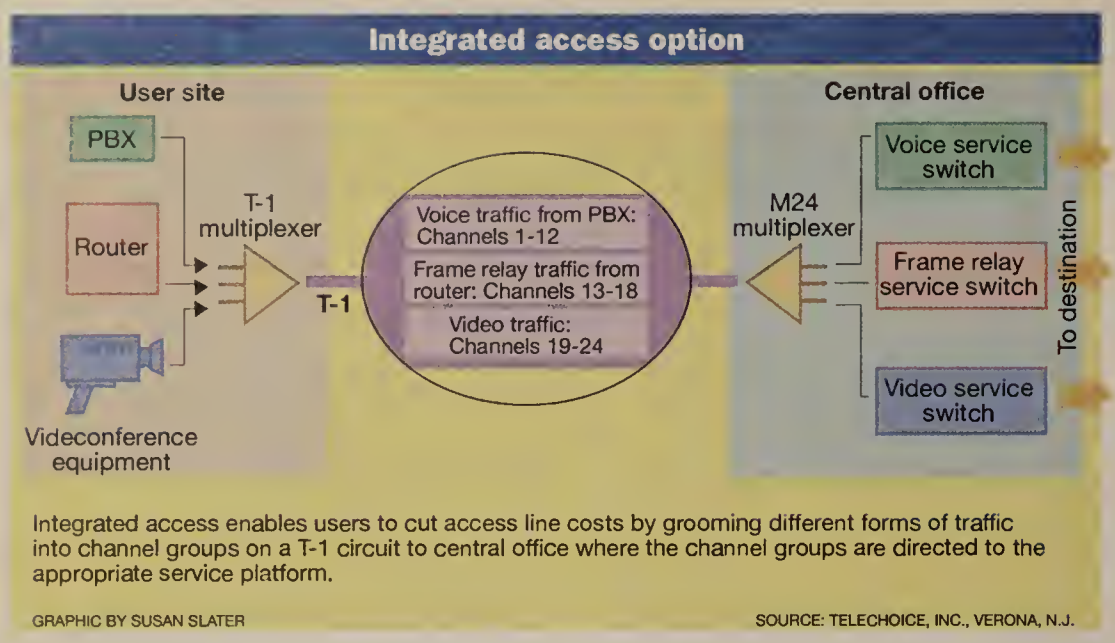


Integrated access enables users to cut access line costs by grooming different forms of traffic into channel groups on a T-1 circuit to central office where the channel groups are directed to the appropriate service platform.

GRAPHIC BY SUSAN SLATER SOURCE: TELECHOICE, INC., VERONA, N.J.

Continued from page 35

port charges. Interexchange carriers charge a flat port connection fee and add a small charge for each PVC that uses that port.

Another distinction is that carriers charge for the CIR ordered on PVCs. CIR can be loosely defined as the amount of bandwidth guaranteed to be available under noncatastrophic network operating conditions.

The frame relay standard specifies that any data sent at a rate exceeding CIR is to be marked discard eligible. When network circuits supporting multiple PVCs become congested, all traffic marked discard eligible is thrown away in order to maintain the CIR on each PVC.

Most carriers offer CIR for a fixed per-month price. In other words, users can pump as much data as they can across a PVC for one fee, a similarity to private-line pricing. Only MCI and Sprint offer a usage-based CIR, which can be attractive for sites that don't have enough traffic to justify a fixed-rate CIR.

CIR is offered in many different increments ranging from zero to the full speed of the access port, which usually tops out at T-1. And net managers are sure to be confronted by conflicting views from carriers about if and when they need to allocate CIR on a particular PVC.

Currently only offered by MCI, Sprint and US West, zero CIR does not promise any particular sustained transmission rate, and, therefore, does not necessarily afford the user with any consistent level of network performance. Information transmitted across a PVC with a zero CIR is the first to be discarded in times of abnormal network congestion.

Nearly all carriers are now offering incremental CIR. For instance, BT offers CIR in 16K bit/sec increments. This means net managers can assign bandwidth to PVCs in blocks of 16K bit/sec up to the full port speed. Other carriers such as CompuServe offer CIR in 4K bit/sec increments.

Net managers selecting CIR at anything less than full port speed should know that most carriers allow PVCs to send bursts of data that exceed CIR as long as the bandwidth is available.

The duration of bursting is largely a function of network congestion. Some carriers set a specific time limit on bursts in order to make sure bandwidth is available for other customers. Other carriers say they will allow users to burst for any amount of time until the network starts getting congested and traffic marked discard eligible starts getting tossed.

The bursting allowance shows that each carrier has its own interpretation and implementation of CIR that is based on the frame relay switching platform it uses and its networking philosophy. This means users do not necessarily need to purchase the same amount of CIR to achieve similar performance on different carrier networks.

In the past, most carriers used a StrataCom IPX-based switching platform that did not allow bursting above CIR for anything longer than a few milliseconds. This forced customers into buying some amount of CIR for all connections.

In early frame relay networks, Sprint's TP4900 — which is now called the TPX 1100 and is a joint effort of Alcatel Data Networks and Sprint — allowed for extended continuous bursting above CIR. Sprint leveraged this advantage by pioneering the use of a zero CIR PVC.

Coupling zero CIR with Sprint's usage-based option may provide a less expensive alternative to buying CIR for all network links. "The usage-based option is ideal for companies with field offices which have sporadic usage patterns," says John Lee, manager of information technology at Falcon Microsystems of Landover, Md. Availability of zero CIR and usage-based pricing was a big factor in Lee's selection of Sprint.

Recently, StrataCom introduced its Foresight software, which allows carriers using the IPX to support the same type of extended burst capability as Sprint. Foresight enables the IPX to use a unique, closed-loop congestion management system. Of course, Foresight is only a tool and each carrier using the software can choose how it will offer the new feature to their end users. Since Foresight is really a congestion management solution, users should ask carriers to provide an in-depth description of both their sustained burst options and their approach to congestion management.

Carriers that use other switching platforms also have different performance characteristics and management schemes. The end result is that CIR, while meaningful, is not going to be an absolute measure of performance.

Another option some carriers provide is an oversubscription allowance. Oversubscription enables users to assign full port speed to each PVC terminating into a single port. This enables one PVC to operate at full CIR when all others are idle. When more than one PVC is transmitting, they contend for bandwidth.

Network managers may want to consider the possible impact of sustained bursts on applications, which are sensitive to variations in network performance, and on the expectations of network users.

Some applications and protocols perform best in an environment where network delay is predictable. For example, in an order entry environment, order takers develop a rhythm for filling in information on terminal screens — typically traditional SNA terminals — and will appreciate consistency in screen delays and updates.

It matters less that a few seconds are saved in transmission and more that the rhythm is maintained for such an application. A sustained burst capability may actually reduce overall user productivity because the order taker can get distracted by screen updates that are too quick or may need to call back screens that disappeared too quickly. In this case, it may be optimal that the frame relay PVC emulate a dedicated connection and not allow sustained bursts.

Other applications and protocols may not have a sophisticated recovery system that can detect when frames that exceed CIR have been discarded. Without the ability to detect and regenerate these missing frames, it may be better to proactively avoid the event by ensuring that transmission speed on PVCs supporting such applications and protocols never goes beyond CIR.

Additional forms of pricing net managers can expect to encounter include:

- **SVCs.** Now that the frame relay forum has released specifications for an SVC, net managers can expect frame relay switch vendors to start implementing that capability in their hardware. Once the hardware implementation is done, which should take about a year, carriers can start rolling out SVC services.
- **Asymmetrical PVCs.** Offered by WilTel, MCI and AT&T, this form of pricing offers a more flexible way to handle varying network requirements. Asymmetrical PVCs enable users to assign different CIR speeds on a PVC based on the direction of traffic. For instance, small frames of data requesting information from a remote server can be transmitted at low speed. The server can then transmit the large frames of data needed to satisfy those requests at a higher speed.

BEGINNING AT THE END

Aside from cost, a critical area that should be considered when selecting PVC and CIR speeds is the expectations of end users. SNA managers have long been proactive in engineering the network so that performance over time, even as more and more users are brought onto the net, is consistent.

Take, for example, a network manager that deploys frame relay to support several remote work groups consisting of an engineering and development team, several remote sales offices and a remote data processing site.

Because the number of users in the initial network configuration is relatively low at each site — only those work groups connected to LANs and screaming the loudest for connectivity — a conservative CIR is provided. A relatively low initial network utilization enables users to consistently enjoy transmissions above CIR. All the users get accustomed to very rapid file transfer time and quick network response.

The net manager is happy because the network is performing better than what was set out in the contract. The end users are happy because the network is delivering outstanding performance. However, the network manager begins to provide connectivity to more and more user groups and applications. Even though those groups and applications are added in a cost-effective and easy manner, the original network users are no longer happy because they perceive network performance is starting to drag.

More users means more contention for network capacity. More PVCs are active simultaneously, meaning that less and less excess port capacity is available for allocation to PVC bursts. The network may still be consistently delivering a transfer rate slightly in excess of the CIR that was purchased, but the actual performance from the end user's perspective has decreased over time.

These original users are no longer satisfied with the network's performance because their expectations have been set by past performance and those expectations are no longer being met. The network manager begins receiving complaints. End users are demanding to know why the network is no longer providing the level of performance and response to which they have grown accustomed. The manager is no longer happy because either more CIR must be purchased or a service that is now considered unsatisfactory must be maintained.

Therefore, the proactive management of these end-user expectations should be considered. Depending on the planned growth, the user applications and the expected network performance, it may once again be more appropriate to provide consistent network perfor-

Frame relay switching platform used

Carrier	Switch vendor	Model
Ameritech	AT&T	Broadband Networking Switch-2000
AT&T	StrataCom, Inc.	IPX
Bell Atlantic Corp.	Siemens Stromberg-Carlson	EWSM
	Cascade Communications Corp.	STDX 6000
BellSouth Telecommunications, Inc.	AT&T	*
	Cascade Communications	*
BT North America, Inc.	StrataCom	IPX
Cable & Wireless Communications, Inc.	Northern Telecom, Inc.	DPN 100 series
CompuServe, Inc.	StrataCom	IPX
EMI Communications Corp.	StrataCom	IPX
MCI Communications Corp.	Siemens Stromberg-Carlson	EWSM
	Wellfleet Communications Corp.	Backbone Node Switch
NYNEX Corp.	Northern Telecom	*
Pacific Bell	Newbridge Networks, Inc.	3612 Main Street
PacNet, Inc.	Cascade Communications	STDX 6000-B STDX 9000
Southwestern Bell Corp.	Northern Telecom	DMS-100
Sprint Corp.	Alcatel Data Networks/Sprint	TPX 1100
US West Communications, Inc.	AT&T	Broadband Networking Switch-2000 and Datakit
	Cascade Communications	STDX 3000/6000
WilTel	StrataCom	IPX

* Model not provided

mance over time.

Coyne Gibson, telecom manager at Convex Computer Corp. of Richardson, Texas, says one of the single overriding objectives in his network design is to ensure that any user accessing the network from any location worldwide at any time of the day or night will experience a constant look and feel to the system and the network performance.

If predictable and consistent network performance is a critical factor, then managers may want to consider a frame relay network design that optimizes around this objective.

WilTel, for example, allows users to set the sustained burst rate of each PVC at any level between the PVC's CIR and the port connection speed. This allows each PVC to be optimally designed to support the end users and applications that will utilize it. If the sustained burst rate — called the maximum sustained transmission rate — is set equal to the CIR, then the PVC will function like a dedicated connection, while still maintaining its ability to automatically route around network failures.

NEW ACCESS OPTIONS

To go along with design alternatives, carriers are rolling out new access options. As late as a year ago, customers used a dedicated T-1 or 56K bit/sec line to reach an interexchange carrier service.

As anyone running an enterprise network knows, dedicated connections have limitations, particularly when it is becoming increasingly important to support network access for mobile and remote workers as well as sites with low usage.

Most carriers are planning to offer high-speed dial-up access to frame relay, but currently only AT&T and Sprint support analog dial-up access. Sprint also offers access to frame relay via dial-up circuits that support the Internet Protocol at up to 14.4K bit/sec.

The rest of the carriers are still involved in pilot programs and have yet to roll out dial-up service. But net managers can expect to see a variety of dial-up options emerging over the next year or two. Those options include dial-up X.25 access to frame relay, as well as access via asynchronous links, Integrated Services Digital Network circuits and dial-up facilities that support the Point-to-Point Protocol.

Another new form of access will provide disaster recovery options. While a public frame relay network provides excellent redundancy, the customer's dedicated access line still represents a single point of failure. Carriers are now helping their customers figure out and install backup access arrangements.

The basic issue is that any backup circuit must terminate to the same port on the frame relay switch in order for network traffic to reach users at the affected site, and vice versa. The reason for this is that the frame relay interface on routers at the customer site only read the wide-area portion — the Data Link Control Identifier — of the frame relay address, which denotes a particular port.

It is possible to provide alternate routing through the use of dual access lines connected to a single router. If two local loops are used at one location to provide local access redundancy, then three alternative architectures are possible.

First, each loop can terminate into a separate port connection and each port can have its own set of PVCs.

In this first architecture, each remote site has two PVCs back to the central site. However, each PVC has only half the CIR it would otherwise require and the port speeds at the central site — where two access circuits and two ports are being used for redundancy — are only half the speed. The router then load balances the traffic between the PVCs. If one access line at the central site should fail, all connectivity to remote locations is maintained but at half of the normal speed.

Sprint, WilTel and MCI have customers utilizing this first architecture with success. WilTel calls this configuration dual-homing. The two port connections can even be in different cities or on different backbone switches, which provides further protection against single points of failure.

The second option entails the use of an A/B switch placed in front of the port on the frame relay switch within the carrier's POP. The A/B switch supports two local loops, each terminating into the same router at the customer site. In the event of a local loop outage, the user can dial directly into the A/B switch and manually activate the backup loop. The router must then be configured to transmit all traffic over the back up loop.

The last option is a variation on the A/B switch theme. For instance, net managers can install automatic protection switches in front of the router and ask the carrier to do the same in front of the port on the frame relay switch at the POP. In theory, this solution would provide real-time monitoring of the primary access line and automatic switching to the backup line. In practice, it would also add two additional single points of failure.

There are other disaster recovery options aside from providing dual dedicated access lines. For instance, MCI supports dial-up 56K bit/sec access to the A/B switch so that a dedicated local loop does not need to be purchased. This can provide significant cost savings if the location can be adequately backed up with a 56K bit/sec connection. Sprint offers switched digital access to a backup switch and port in the case of switch outage.

Another issue of access is the ability to get onto the Internet. AT&T, Sprint, WilTel and EMI Communications all offer the option of dedicated access to the Internet via frame relay. This is typically done by providing a connection from the carrier's frame relay network to a port on an Internet access provider's

Continued on page 40

Carriers march to user's beat

When setting out to acquire a frame relay service, Cadence Design Systems, Inc. did everything it could to get carriers to provide what it wanted.

"Set defined values and make the carriers measure up to them," advises Edward Bowden, senior manager of telecommunications at Cadence, a leading provider of automation software for integrated circuits and accelerated electronic systems design in San Jose, Calif.

Bowden knows whereof he speaks, having evaluated frame relay carrier services twice during the past three years. Bowden conducted his initial evaluation in 1991, when the need became clear for higher speed dial-in capabilities for electronic mail and sales order entry. In 1993, he spent three months reevaluating frame relay services to identify a carrier that could meet his firm's international networking needs.

Bowden based his carrier selection on two key criteria: outsourcing routing operations and adherence to price targets. He launched his first investigation into frame relay services by visiting four prospective carriers several times to gain an understanding of their data networking strategies. He came out of that fact-finding mission with a feeling that there were two camps of carriers: those that were used to selling circuits and viewed frame relay service as base transmission, and the traditional value-added network carriers that were offering a more complete package.

"We told everybody that we did not want to buy or maintain our own routers, and the carriers who were responsive to that remained under consideration," Bowden says.

He was equally successful in meeting his cost objective. "We figured [the cost should be] about $1,000 to $1,200 per site per month, and by the end of the negotiations, we had achieved that figure," Bowden said. He reached that cost range by reviewing all available price quotes and applying them to his company's situation.

The end result was a domestic 20-node CompuServe, Inc. Frame-Net Internetwork that was implemented in about 10 weeks and cost about two-thirds that of an equivalent private-line network.

When it came time to expand internationally, "We set the same kind of benchmarks for cost savings as we did for the domestic net," Bowden says. But he went beyond pricing and routing outsourcing when examining carriers' global net plans. For instance, Bowden wrestled for three months to evaluate carriers' international net management capabilities to his firm's overseas site and chose CompuServe to install links to locations in France and Germany.

While he twice gave the nod to CompuServe, Bowden points out that the choice of an international provider can be totally unrelated to the domestic choice. "Support issues are far more important for international than domestic service, as is experience in providing an end-to-end service," he says.

Interestingly, Bowden found that international frame relay can be easier to administrate than international private lines because it avoids local taxation issues. Basically, this means U.S. companies that order a frame relay circuit in a foreign country do not have to pay local taxes on those circuits.

C. Finn

Continued from page 39

router.

Users of a carrier's frame relay service can assign a PVC that defines a path to the Internet provider's port. Doing so establishes connectivity to the Internet without incurring the cost of a separate router, Internet access loop or port connection. WilTel partners with several Internet access providers, giving end users a choice. AT&T and Sprint offer dedicated links to Internet providers.

NETWORK MANAGEMENT

The ability to manage a frame relay network is also a critical decision-making factor, especially for users migrating from private-line arenas. A well-implemented network management system can decrease network operation costs by improving the ability of the network manager to remotely identify, isolate and resolve network problems.

Carriers have been forced to develop a unique set of management options for frame relay. Service management designers have bowed to the standards and needs of the LAN environment in creating solutions. For instance, the Simple Network Management Protocol is the widely supported choice today. Carriers are offering SNMP applications that run on various SNMP-based management consoles. They are also offering fully configured SNMP workstations and centralized management of their frame relay hardware via SNMP.

Carrier plans for supporting frame relay over ATM

Carrier	Date
Ameritech	4Q 1994
AT&T	2Q 1994
Bell Atlantic Corp.	*
BellSouth Telecommunications, Inc.	2Q 1994
BT North America, Inc.	1994/1995
Cable & Wireless Communications, Inc.	1Q 1995
CompuServe, Inc.	1Q-2Q 1994
EMI Communications Corp.	1Q 1995
MCI Communications Corp.	**
NYNEX Corp.	3Q 1994
Pacific Bell	1Q 1995
PacNet, Inc.	2Q 1994
Southwestern Bell Corp.	1Q-2Q 1996
Sprint Corp.	4Q 1994
US West Communications, Inc.	3Q 1995
WilTel	Dec. 1993

*To be determined possibly by 1Q-2Q 1995
**To be determined
ATM = Asynchronous Transfer Mode

The chart on page 34 notes that 10 of the 16 carriers listed enable customers to manage their frame relay services via SNMP. While the use of SNMP makes management capabilities roughly equal among the carriers, there are differences in the platforms supported and whether the carrier provides the SNMP management and workstation application. AT&T and MCI, for instance, offer a prepackaged SNMP workstation with their SNMP-based frame relay service management application.

However, most network managers already have their own management system in operation. SunConnect's SunNet Manager, Hewlett-Packard Co.'s HP OpenView and IBM's NetView are the most common. It is important to be able to manage the frame relay network by being able to receive such information as alarms and gain access to such data as performance statistics from existing tools. Carriers that support an SNMP agent in the frame relay equipment within their network cloud allow such management information to be obtained without forcing customers to invest in new hardware and software.

Carriers have also installed SNMP-based management internally and can offer outsourced SNMP-based management of customer premises equipment, such as data service units/channel service units (DSU/CSU) and routers.

AT&T will provide customers with Cisco Systems, Inc. routers and Verilink Corp. CSUs, and manage that equipment as part of its Extended Connectivity Option. WilTel likewise provides and manages 3Com Corp., Cisco or Wellfleet Communications, Inc. routers as part of its LAN internetworking service, while Sprint offers SNMP-based management of ADC Kentrox DSU/CSUs and either Cisco or Wellfleet routers. CompuServe provides managed Verilink CSUs.

Net managers preferring to stay away from SNMP can still receive reports of network utilization and performance. Several carriers will supply these reports on paper or via a terminal attached to the carrier management system. These reports can provide insight into the level of utilization of a PVC over a given time period as well as information that is useful in fine-tuning the network configuration.

Some carriers such as WilTel are beginning to offer net managers the ability to use a terminal that taps into the carrier frame relay management system to order new PVCs or request configuration changes. Real-time network reconfiguration is probably not far behind.

NEGOTIATING FOR FRAME RELAY

After poring over all the differing service options, the last thing net managers have to do for a frame relay service is negotiate with the carriers. While carriers are still a little sheepish about quoting prices publicly, they have no problem providing a quote within the confines of a request for proposal. In fact, net managers will find the prices quoted in an RFP are often better than the ones stated publicly.

In preparing an RFP, users should make the carriers put pricing information into a common format with a detailed summary of per location charges and PVC charges.

Companies putting up entirely new networks or moving from dedicated circuits to frame relay will probably have difficulty in sizing access ports and PVCs. The first reason for this is that they may not have a functioning network to use as a baseline, and the second is that users do not get any traffic statistics from private-line networks unless they use a protocol analyzer on each circuit.

As a result, it is not really possible to take a snapshot of the entire enterprise network at once. Users need to ask carriers to provide pricing on a range of scenarios and invite them to provide as much analysis of the potential network needs as possible. This will not only help in the implementation, but it will also give a good view of the carrier's expertise.

Although net managers will be putting an entire network out to bid, they should require the option of installing one or two test links before committing to full installation. This is especially important for those with no frame relay experience. Really, there is no sure way to know how a particular service will support specific applications unless the net manager does a little experimenting first.

As mentioned, frame relay networks, unlike digital private lines, have individual performance characteristics that can be tuned down to the individual PVC level. No longer can you generalize about carriers by platform switch. The switch is now akin to a musical instrument; there are good and bad instruments, but the true difference depends on who is the musician.

When putting a net out for bid, there is no right configuration and sizing. This is another reason why it is important to go through a trial stage before full implementation.

Lastly, net managers should make the carrier commit to network and service support performance levels and back them up with service rebates. This once strictly European custom is becoming more common in the U.S., and carriers are more or less amenable to it based on contract size.

FRAME RELAY FOR THE MASSES

As is becoming evident, frame relay is the first of many high-speed internetworking services to be offered successfully by carriers. Customers will be able to choose the correct service for their needs, and, as distributed computing hits the mainstream, customers will be able to plug new sites into the carrier's high-speed backbone through their selected interface mechanisms.

Further, carriers are making it extremely inexpensive to make connections from one enterprise to another. Imagine calling a carrier and ordering a link to a new trading partner without having to make any physical changes to either network. The carrier simply installs PVCs between the two virtual networks, and the customers make the appropriate changes in their routing tables. It does require that the two parties be subscribers to the same network.

While frame relay is not the sexiest of the new fast packet or cell services, it is providing exponential leaps in bandwidth for a lot of mainstream companies. Most frame relay users will testify that the service delivers on its promise of flexible bandwidth, but carriers have had to come a long way to offer an effective service.

Frame relay is a big step on the road to broadband services, and those who choose to wait rather than implementing frame relay just may end up that much farther away.

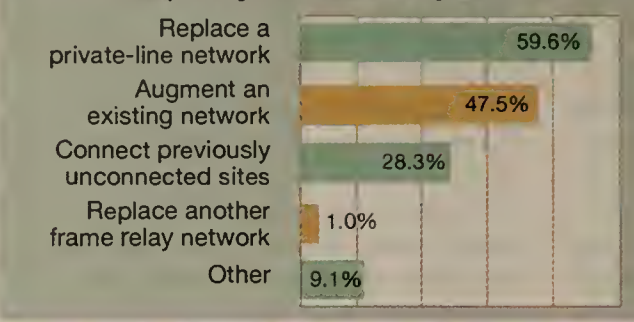
"Sooner or later, [upper] management is going to ask what you are waiting for," says PMI Mortgage Insurance Co.'s Fey.

Finn and Heckart are senior analysts with TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. They can be reached at (201) 239-0700 or via MCI Mail at 445-4690.

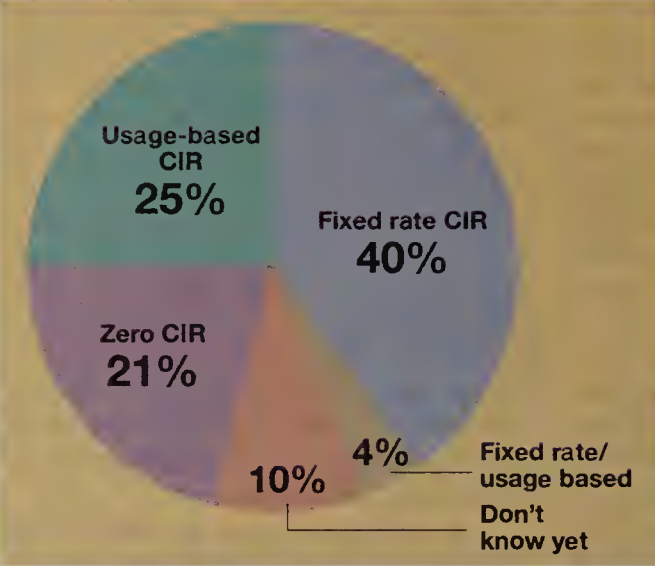
Reader views on frame relay services

Based on 100 interviews.

Does/will your frame relay service:



What frame relay permanent virtual circuit committed information rate (CIR) options do/will you use?



What are your determining factors in selecting a frame relay service?

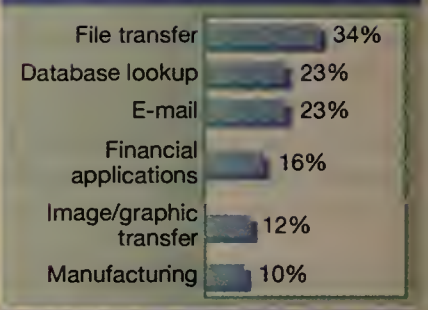
Usage-based pricing	38.5%
Ability to carry multiple protocols over a single network	32.3%
Overall cost	30.6%
Flexibility to add new locations	26.0%
LAN interconnection	26.0%
Bandwidth	23.5%

How much of a role did the following play in justifying your frame relay implementation?

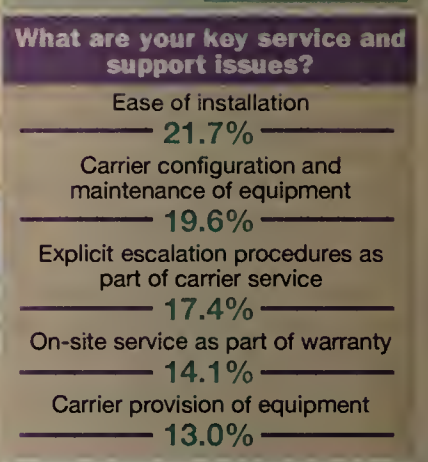
Based on highest possible ranking of 7.

Cost benefit over existing private line	5.83
Upgrade of network technology	5.69
Network implementation	5.45
Need for mesh connectivity	4.50
Need to outsource some management of data network	3.14
Other	1.00

What are your key business applications that use/will use frame relay?



What are your key service and support issues?



The information in this graphic illustrates key findings of a recent *Network World*/ Focus Data, Inc. reader survey. Focus Data, an independent market research firm in Framingham, Mass., conducted the survey and tabulated the results. For more information on Focus Data services, call (508) 626-2556.

GRAPHIC BY TERRI MITCHELL

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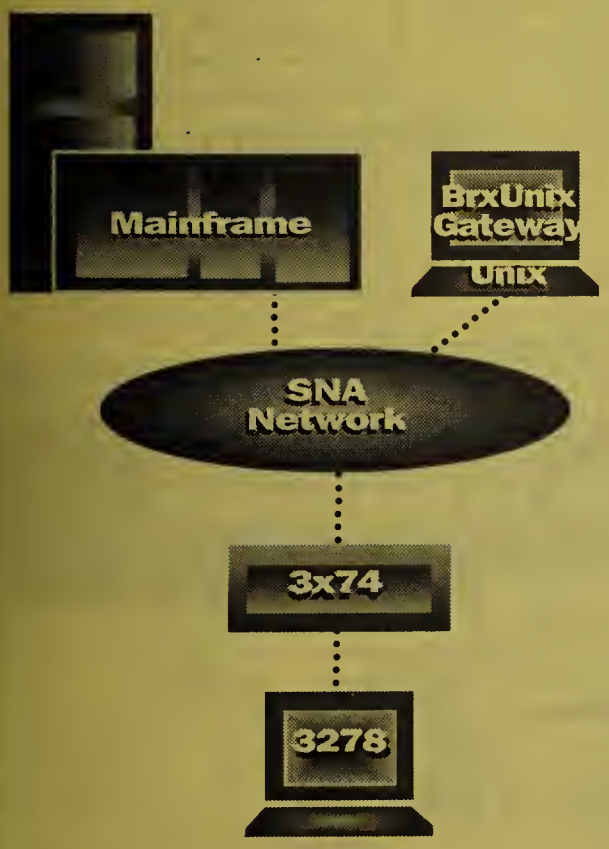

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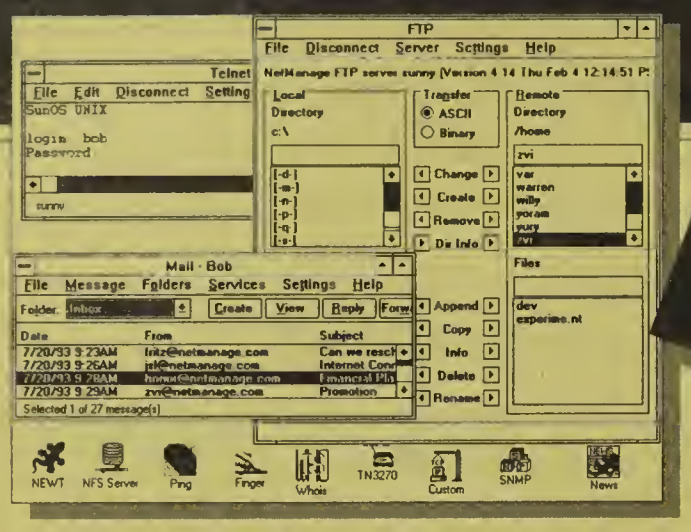

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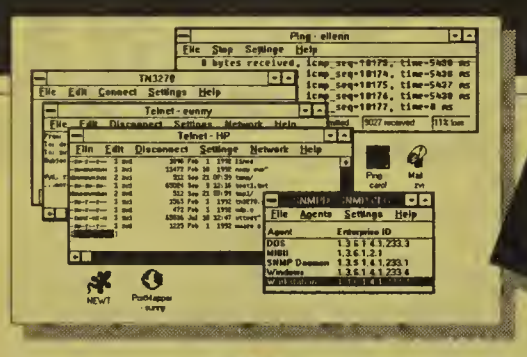

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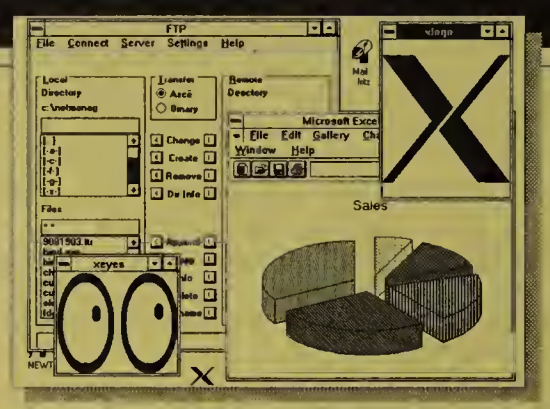

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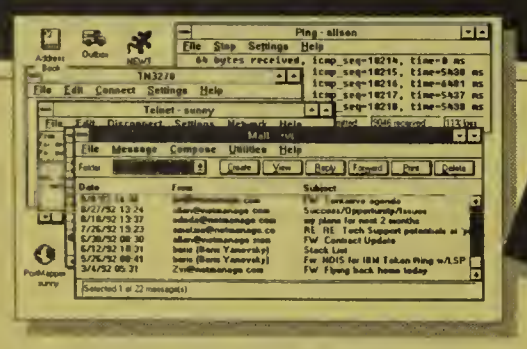

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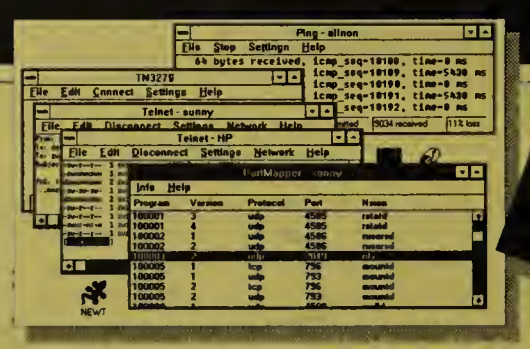

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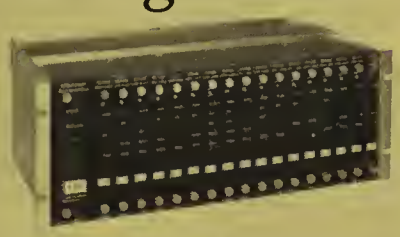

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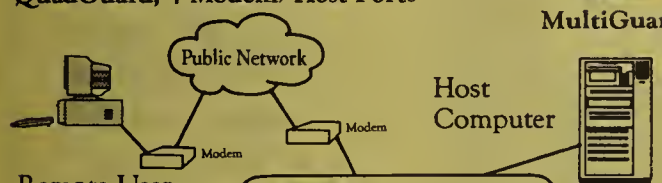

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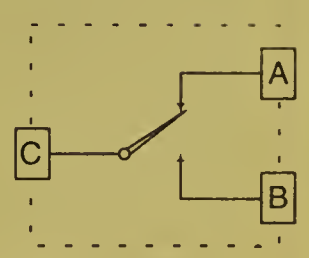

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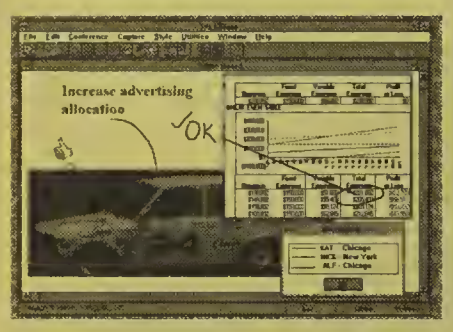

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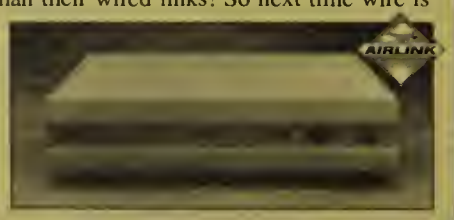

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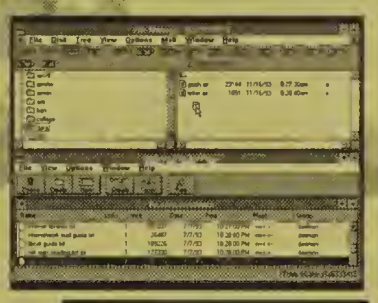

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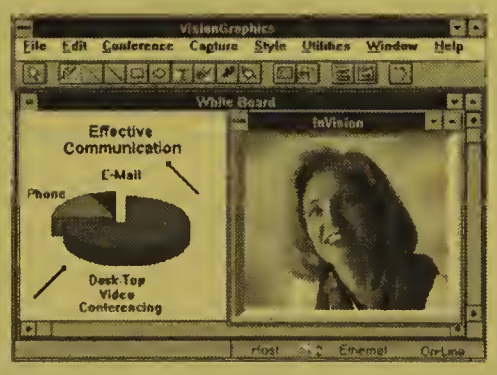

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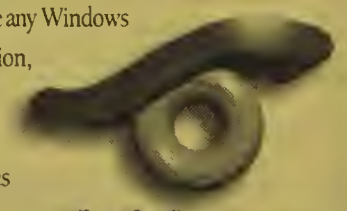

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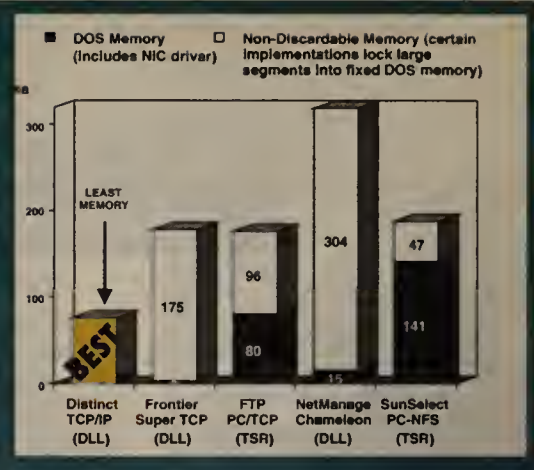

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Help desk

Continued from page 2

If you opt for a dedicated data line, you will need to buy more hardware and software products. For each end of the data connection, you will need Novell's MultiProtocol Router, a synchronous interface card and a data service unit/channel service unit to connect the synchronous interface card to the phone line.

I am using Windows for Workgroups on 45 Intel Corp. 80386 and 80486 PCs. Each uses 10Base-T and is connected to a corporate internetwork. Currently, I am using NCSA Telnet to access the Ethernet for mail from the Internet, but cannot concurrently use the NCSA Telnet with Windows for Workgroups. Are you aware of another version of Telnet that is a Dynamic Link Library (DLL) and is compatible with Windows for Workgroups?

Robert Meixner, Richmond, Va.

Ted Malone, a systems engineer at Typetronics Business Systems, Inc., a network integration company based in Phoenix, responds:

NetManage, Inc.'s Chameleon product line is a 100% DLL-based TCP/IP protocol suite for the Windows product family. Chameleon provides terminal emulation (Telnet, tn3270); file transfer (File Transfer Protocol, Trivial FTP); E-mail (Simple Mail Transfer Protocol, point of presence); remote host dial-up access (Serial Line IP, Point-to-Point Protocol); Internet access tools (news reader); and network utilities. The product requires only 6K bytes of base memory on client workstations and allows as many as 128 simultaneous connections (you can Telnet in the foreground while FTPing in the background). Chameleon 3.11 is priced at $400 per single user and $195 per 50-user license. For more product information, call (408) 973-7171.

NW also found that Spry, Inc.'s Air Series 2.0, a modular suite of Windows-TCP/IP applications, provides PC-to-Unix, mainframe and Internet connectivity. The Air Series is not only compatible with Windows for Workgroups but will work over any TCP/IP transport. The modular product structure allows customers to purchase only the applications they need. For instance, users who want the full suite of applications can purchase Air Network File System, which includes Unix, mainframe and Internet connectivity. Pricing starts at $399 for a single-user version and $190 for a 50-user license. But, if only Telnet is required, users can purchase Air SQL for $149 for a single-user version and $65 for a 50-user license. For product information, call (800) 777-9638.

Letters

Continued from page 31

More than one way

Further regarding PC-ism and the letter from Chuck Gibbons: Mr. Gibbons apparently does not snap to or can't handle the fact that

any well-designed Macintosh program provides more than one way to do most things. If he ran a supermarket he would probably have all the merchandise in alphabetical order.

By the way, Mr. Gibbons, AppleWorks runs on an Apple II, not a Macintosh.

Eric Bear Albrecht
Owner
Presto Computers
Taos, N.M.

Compatible products

Unfortunately, an error in the information we provided to the authors of your Packet Switches Buyer's Guide (Dec. 20, 1993, page 33) led to the compatibility of Amnet, Inc.'s packet switches being misstated. In reality, Amnet's Nucleus 7400 Network Switch and Nucleus 7500 Network Switch packet switches are compatible with other manufacturers' switches that support X.25, X.75 or ANSI frame relay.

Let me add that I found the feature interesting and the analysis insightful, and look forward to more on the same subject.

Nina Saberi
Senior vice president
Amnet, Inc.
Framingham, Mass.

Don't generalize

The Network Help Desk in your Dec. 20, 1993, issue contained a well-intentioned effort to address issues concerning choosing an Internet service provider.

We at BBN Technology Services, Inc. (BBNTSI), providers of NEARNET service, believe that these are important issues and applaud your coverage of this topic. However, the column contained several inaccuracies I would like to correct.

You imply that regional service providers do not offer unrestricted Internet access, yet many regional providers are Commercial Internet Exchange (CIX) members and provide commercial access, which is the same as, or superior to, that of national providers. BBNTSI has been a longtime CIX member, and I was recently elected to the CIX board of directors.

You imply that all regional providers cater primarily to the education and research community, but BBNTSI is one of several regional Internet service providers, the majority of whose clientele is commercial. Additionally, you imply that most regionals provide only dial-up access; however, all regionals provide leased-line Internet access, and for most it is their major business.

You conclude that Internet service needs for national/multinational corporations can be met only by national service providers. Most national/multinational corporations have private networks interconnecting branch offices, and a single connection to a private network is all that is needed to bring the Internet into a worldwide corporation.

Geographic coverage is not a criterion for providing Internet service to most national/multinational corporations.

You indicate that only national providers offer advanced services. In fact, some national providers offer no advanced services, and some regional providers offer impressive arrays of such services.

I advise your readers to evaluate Internet service providers on the basis of service quality and the ability to meet client needs, and to treat generalizations warily.

John Rugo
Vice president and chief
operations officer
BBNTS.
Cambridge, Mass

Firm readies X.400, X.500 tools for Novell's MHS

BY ADAM GAFFIN

Kirkland, Wash.

Firefox, Inc. last week said it will deliver a series of X.400 and X.500 tools to link messaging applications built on Novell, Inc.'s Global Message Handling System (MHS) with other messaging systems.

The company said it hopes to begin shipping the first of these products by midyear. Included will be X.400 gateways built as NetWare Loadable Modules, as well as similar software for Novell's UnixWare.

Other offerings will include address translators and directory synchronization tools to connect Global MHS systems with electronic mail packages such as Lotus Development Corp.'s cc:Mail and Microsoft Corp.'s Microsoft Mail, as well as with networks using Transmission Control Protocol/Internet Protocol.

The company said it would also ship later this year an X.500 server that will let Novell's 4.X NetWare Directory Services act as a corporate X.500 directory service in a network that can include Microsoft Mail, cc:Mail and MHS directories. Firefox has long licensed Novell's Open Systems Interconnection technology.

Firefox said it will compete, in part, by trying to undercut competitors' prices.

Greg Cline, program director of network integration and management at the Business Research Group, a consulting firm in Newton, Mass., looked favorably on Firefox's efforts.

But he cautioned that looming over the horizon is Microsoft, which is also planning a midyear launch of its X.400-based Enterprise Messaging Server.

Michael Rothman, an analyst with META Group in Reston, Va., was more skeptical, pointing to offerings from companies such as Retix, Inc., which he said already perform such E-mail routing well.

✆Firefox: (206) 827-9066.

Migration

Continued from page 1

the product's ability to manage DEC nets as capably as Polycenter Framework (*NW*, Dec. 13, 1993, page 1).

The company is also responding to a strategy outlined by Ki Research, Inc., a small software firm that specializes in DECnet management tools that run on Hewlett-Packard Co. OpenView-based platforms, like NetView/6000 (*NW*, Jan. 31, page 1).

DEC's plan includes slashing the $15,500 list price for Polycenter NetView by 70% to 90% for existing Polycenter Framework shops, said Bill Gassman, DEC product marketing manager for Polycenter network management. The product is scheduled to ship in March, he said.

Scott Davis, senior systems programmer at Bechtel Corp., said of the pricing, "That's pretty good. It's reasonable." He added, however, that Bechtel will probably exhaust Polycenter Framework's three- to five-year lifespan before migrating.

But Matt Holdrege, senior network specialist at PacifiCare Health Systems, Inc., said the discounts don't go far enough. "We expected a license swap" between Polycenter Framework and Polycenter NetView, Holdrege said. "We'll pay if we have to but we expected a direct swap."

Holdrege also expects a discount on the OSF/1-based Alpha workstation Polycenter NetView runs on, and training credits for learning how to use it. Most Polycenter Framework users run it on VMS hardware and are unfamiliar with OSF/1.

DEC will also unveil in June DECnet Manager for NetView, DECnet management software that runs on Polycenter NetView.

The first release of DECnet Manager will discover, map and monitor DECnet Phase IV and DECnet/OSI nodes from a Polycenter NetView console. The product will let Polycenter NetView receive the same DECnet alerts as Polycenter Framework. Users can then pull down an X Window or Telnet screen to issue commands to Polycenter Framework.

DECnet events will be gathered by DEC's Polycenter Framework Event Collector application, which has been ported to Polycenter NetView. DEC is also considering sending DECnet events to Polycenter NetView, or any other Simple Network Management Protocol console, as an SNMP TRAP, Gassman said.

"We found [Polycenter Framework] overly complex for our needs. That migration is just going to add to the complexity," according to Bill Mitchell.

The first release of DECnet Manager on NetView might be more than some users can handle. "We found [Polycenter Framework] overly complex for our needs," said Bill Mitchell, computer operations supervisor for the city of Chandler, Ariz. "That migration is just going to add to the complexity."

That's why DEC officials believe users will want to wind down Polycenter Framework as soon as possible. "We're encouraging customers to look at [Polycenter] NetView to manage [Internet Protocol nets] and DECnet as we roll out the DECnet Manager," said Gail Ferreira, DEC's Polycenter business manager. "We expect to fully support the DECnet environment on top of Polycenter NetView over the next year."

Gassman believes that migration strategy is more attractive than Ki's. "The alternative looks like you have to buy the Ki product, their DECnet stack, the Phoenix technology and NetView/6000 at the full price. There's four products there, all of them probably more expensive than the total solution from us," he said.

Gassman also said the Ki plan seemed to offer only coexistence instead of full migration, which the DEC strategy provides.

Ki President Jim Corrigan reserved comment on Gassman's assertions until DEC ships its products and publishes a price list, as Ki has.

Price is the main determinant for the city of Chandler. "If it came down to a dollar issue and I'd be spending the same amount of money, I'd probably be looking more towards Ki," Mitchell said. "They're a proven entity, as far as I'm concerned, on VMS-to-Unix migration."

✆DEC: (800) 344-4825.

LEGENT

Continued from page 9

which most software distribution offerings today depend on," said David Kirk, vice president and general manager of LEGENT.

LEGENT already offers DistribuLink-MVS, which distributes software from an MVS mainframe across Systems Network Architecture nets. This product and the new offering will not work together initially, although Kirk did not rule out such interoperability for the future.

DistribuLink-Unix consists of a central server module and client code.

The server software includes Warehouse Manager, a database in which net managers can store definitions of all net resources from individual users or groups of users scheduled to receive software updates. A Profiler feature keeps track of when computers are free for updates to occur, and a Scheduler lets network managers set times for automatic, unattended software updates.

The client code lets any desktop computer accept software upgrades over the net, even when the system is turned off. It also alerts the server to any data-transfer failures.

With this set of features, users can send single software updates to individual workstations or multiple updates to many devices using a broadcast mode.

DistribuLink-Unix also has a checkpoint/restart function that, in the event of a failure, enables the server to retransmit only the data that did not make it to the target client. This helps reduce network traffic.

DistribuLink-Unix also automatically tracks the software and files it transfers so users can have a record of what was delivered and when.

Users at beta-site Au Bon Pain Company, Inc., a Boston-based restaurant chain, cited the tracking capability as a major attraction.

"Without DistribuLink, we have no way of knowing which stores have been successfully updated or which sites have which version of pricing software until users start complaining," said Larry Zogby, a systems analyst with the company. "With DistribuLink controls and confirmations, we automatically know that everything has been completed."

Zogby said about 1% of his 180 stores regularly fail to receive updates overnight because of line failures or store systems not being turned on and ready to receive information. Those problems should be eliminated with DistribuLink.

DistribuLink-Unix server software costs from $900 to $45,000, depending on the number of users supported. Client software ranges from $150 to $400 per node. The product is available now.

✆LEGENT: (703) 708-3000.

Octel

Continued from page 8

Octel's goal is to develop voice-integrated E-mail, which would let a user phone in to receive mail messages provided by voice response.

Most attempts to provide voice-integrated E-mail have been centered on terminal-oriented mail packages, rather than LAN-oriented packages such as Microsoft Mail and cc:Mail, Van Doren said.

Cohn said he hopes the VMX technology will accelerate Octel's move into a world of voice and data integration, where "the voice mail system is really the voice server to the LAN."

Octel's strength has traditionally been in voice mail systems rather than advanced applications. But its sales savvy will help bring VMX's advanced products to more customers more quickly.

The addition of VMX's customers also will enable Octel to leapfrog over voice messaging systems sold directly by the leading private branch exchange manufacturers.

"I think the reason this deal happened is you'd create what is clearly the strongest company in the industry — even stronger than Rolm," said Daniel Stusser, principal in The Ergotec Group, a Seattle-based consultancy.

Both companies' product lines will be maintained indefinitely, Cohn said. But "there are some product transition challenges," said Steve Levy, an analyst with Hambrecht & Quist in New York City.

To make the systems interoperable, Octel will develop a networking protocol called OctelNet, he said. The firm does not want to rely on the voluntary Audio Messaging Interchange Specifications protocol, which has been criticized for its low functionality and difficulty of use.

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

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ISSN number: 0887-7661.

Hub analysis

Continued from page 1

[Communications, Inc.] and Chipcom [Corp.]," said Val Sribar, senior research analyst at META Group, a consultancy in Westport, Conn.

But whether Cabletron can deliver at a price users can digest is an open question.

Pricing starts around $500 per port, which is generally twice as much as SynOptics' $223 per-port cost. Cabletron cautioned, however, that the $500 figure is misleading because it includes features such as routing and Remote Monitoring capabilities. As a result, the price of an MMAC-Plus system would be generally lower than other next-generation systems.

Not everyone agreed. "Cabletron's approach is too expensive because every port on every module has the ability to do everything," said Kevin Woods, product manager at SynOptics. "We had the same idea with the RubSystem that we tried to do with Cisco, but users said they just didn't want that."

WHAT'S INSIDE

MMAC-Plus is a 14-slot hub that will concurrently support Ethernet, token-ring, Fiber Distributed Data Interface and Asynchronous Transfer Mode (ATM) traffic across a 10G bit/sec switching backplane that handles packets and cells (*NW*, Dec. 13, 1993, page 1).

Backplane wars
Multichannel vs. packet switching hubs

Multichannel

Separate backplane segments, interconnected via a bridge/router, support different LANs

Advantage:
- Provides security and limits broadcast storms

Disadvantages:
- Shared access approach limits the number of LANs supported
- Limited scalability
- Limited configuration options

Packet switching

Data from different LANs is converted to a common frame format and switched across a single high-speed backplane

Advantages:
- No local bridge/router is required
- Provides efficient use of bandwidth
- Scales in performance and capacity as switching engines are added

Disadvantage:
- More difficult to provide security and fire walls

The backplane capacity will scale up to 60G bit/sec when ATM technology from Fore Systems, Inc. joins the hub in the first half of 1996. The device can support as many as 168 local-area network segments and will provide 5.6 million packet/sec of aggregate throughput when fully loaded, Cabletron said.

Rivals are claiming figures just as impressive. SynOptics, for example, contends that a fully loaded LattisSystem 5000 will offer in excess of 20G bit/sec of backplane capacity, support for 200 LAN segments and 15.4 million packet/sec of aggregate throughput.

According to Cabletron, the MMAC-Plus' distributed architecture is the differentiator. Each MMAC-Plus module will be outfitted with an Intel Corp. i960 microprocessor or series of chips that can be software-configured as a bridge, router or packet switch.

That allows LAN segments supported by different modules to interconnect without a dedicated routing module or stand-alone device — something the SynOptics 5000 will require.

Chipcom's internetworking strategy is unclear: Director of Product Management Gordon Saussy would say only that "we have routing blades under development with other vendors."

"While what Cabletron has sounds great, it is a totally proprietary, closed system," SynOptics' Woods said. "If a user buys into this, it probably means they must throw away all their existing routers because Cabletron has yet to prove its routing schemes work with those of the established vendors."

Cabletron denies it is trying to build a backbone router or compete with the likes of Cisco Systems, Inc. and Wellfleet Communications, Inc.

But providing integrated routing could obviate the need for local routers, said Dan Paton, network manager at Beaumont Hospital in Royal Oak, Mich., a Cabletron shop. However, "you'll still need routers to get you from one WAN cluster to another," he said.

The MMAC-Plus will also integrate LAN-to-LAN and LAN-to-ATM translation. This contrasts with the SynOptics 5000 and the Chipcom ONcore, which will require a separate device or dedicated module to link traditional LAN users to ATM nets (see story, page 6).

Since Cabletron is promising all this capability in a single device, some users were concerned about the physical size of the MMAC-Plus.

For example, the box is simply too big to fit into many wiring closets at Home Savings of America in Irwindale, Calif., said Sam Picture, vice president of telecommunications services and technology.

"Plant space is a valuable commodity; it would really help if they could get that footprint down," he said. Picture is also uneasy about having huge traffic loads run through a potential single point of failure.

"Cabletron should offer the option of an integrated [uninterruptible power supply]. The MMAC-Plus can talk to someone else's UPS for backup, but then I get into the space problem again," he said.

Picture, however, was impressed with the device's virtual networking capabilities, which allow net managers to switch users from LAN to LAN through the management console rather than through recabling.

He added that said Home Savings makes 300 wiring closet visits each month that cost $400 apiece — or $120,000 a month. He said virtual networking should allow him to significantly reduce operational costs or at least "allow me not to grow head count."

Cabletron has also eliminated the need for dedicated network management modules. Any MMAC-Plus module can be configured to act as the "master" module, compiling data from other modules via Simple Network Management Protocol agents. If the master module fails, another can be configured to automatically assume its duties.

While Chipcom and SynOptics offer distributed management schemes in their latest devices, they require a dedicated management card to compile data from the interface modules.

In addition, Cabletron has stretched its level of fault tolerance to include redundant systems and diagnostic buses. "When users are considering a high-end hub purchase, it doesn't come down to price-per-port as much as redundancy," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston.

✆Cabletron: (603) 332-9400.

Oracle

Continued from page 1

Office, which began shipping late last year, supports electronic mail and group scheduling functions.

However, Ellison acknowledged that Oracle Office lacks Notes' ability to propagate databases across a net and to integrate data from sources other than E-mail. Oracle Office works with Oracle databases, but he said Oracle Documents will be more tightly integrated.

Analysts said Oracle is as well positioned as any firm to challenge Lotus' groupware lead. "If Lotus is going to worry about competition for Notes, [it should] worry about the Oracles and Sybases of the world rather than Microsoft [Corp.], Borland [International, Inc.] and WordPerfect [Corp.]," said Dave Marshak, vice president and senior consultant at Patricia Seybold Group, Inc., a consulting firm in Boston.

Analysts said Oracle has several things going for it, including a huge installed base and a developer network that is hungry to exploit document technology. Also, Oracle's relational database model could provide users with richer data access across an enterprise by providing them with documents related to their target data. That's something Notes cannot do, they added.

Oracle plans to release its groupware offering with an affiliated product line, Oracle Text Server, Ellison said.

The new product line with include offerings designed to let users bring structured and unstructured text into their databases. One product, Oracle Context, will be server-based software for reading and semantically analyzing text information not traditionally contained in a database.

The Oracle Text Server line will also include a product, as yet unnamed, that will provide users with summaries of text stored in databases. Such a product could help users reduce net traffic but let them review summaries of data before asking for the complete text.

Ellison said Oracle Documents and Oracle Text Server fit into the firm's broader vision of providing products that address the changing complexion of today's corporate database and communications environment. "Most companies have a wealth of information that is not integrated and accessible under current database environments, a deficiency Oracle is addressing this year through new products," he said.

Many of the new offerings will fall under Oracle's much-publicized multi-

Oracle's CEO Larry Ellison

media technology family — Media Server — which will be formally introduced Feb. 15 (*NW*, Jan. 17, page 6).

Oracle officials also disclosed during the briefing that the firm has quietly begun shipping two server-based gateways that let users integrate data from IBM and Oracle databases.

The Oracle Transparent Gateway for SQL/400 gateway is designed to let users integrate data from Oracle7 databases running on various platforms with IBM databases running on Application System/400 systems. The Oracle Procedural Gateway for APPC will enable users to run applications that can access data on Oracle databases as well as IBM and non-IBM databases that support Big Blue's Advanced Program-to-Program Communications technology. Pricing was unavailable.

✆Oracle: (415) 506-7000.

Utah

Continued from page 1

of large local-area networks that will support myriad local applications for state agencies. Among the applications supported is WordPerfect Office 4.0, which will replace Wang office automation tools supported by an X.25 net that is being phased out.

Even though the setup has improved response time, users won't be paying more for it.

Almost all the LANs are based on Novell, Inc.'s NetWare, and Novell's NetWare for Systems Application Architecture gateway is used to provide access to the SNA mainframe. A few agencies use LANs that run Digital Equipment Corp. Local Area Transport and AppleTalk protocols.

The frame relay net is based on routers from Ascom Timeplex, Inc. Access routers feed LAN and SNA traffic over 56K bit/sec and T-1 lines to Router Bridge, which act as regional hubs. They are connected over T-1 permanent virtual circuits to Salt Lake City, where the data is dumped onto a 100M bit/sec FDDI backbone that serves as the network's central distribution point, connecting to the mainframe and other LANs.

Even though the new setup has improved response time in the SNA net, users won't be paying more for it. The old $25 monthly charge for connecting an SNA terminal will fall to $18, and that lower price buys more connectivity to agencies.

Whereas the old SNA net was basically a point-to-point design, the frame relay net makes it much easier to establish links from one site to many others because multiple permanent virtual circuits can be supported over the same access link.

"Overall costs will increase because we are providing more bandwidth for higher throughput applications," said Joe Leary, state data network manager. "But by bringing all the data onto the single frame relay pipe, we avoid the redundancy of having an X.25, an SNA and a frame relay link at each site."

Even with the bigger pipes, the new network won't break the bank, Leary said. "Having a T-1 [for access] is more expensive than having, for example, two 56Ks — but not by much anymore."

The consolidated backbone will also help bring order to the state's data processing operations. With systemwide naming and addressing conventions, and agreement on protocols and equipment to be supported, the agencies' data processing operations will now be pulling together, Fairless believes.

Along the way, however, Fairless and Leary have hit a number of snags.

NetWare 4

Continued from page 1

tomers were scrambling for higher end features they could not get in NetWare 286. But so far, 3.X customers are not rushing out to buy NetWare 4. NetWare 3.X is a proven, stable environment and some customers believe NetWare 4 provides little beyond improved directory services.

Some analysts predict NetWare 4 will remain a high-end niche product and never realize the success of NetWare 3. "This is a textbook example of a noncustomer-driven product," said Stan Schatt, LAN service director at Computer Intelligence Infocorp, a research firm in La Jolla, Calif. "Customers don't want to move to an evolutionarily dead product like NetWare, they want to move to a Unix-like platform that is a blend of UnixWare and NetWare. Novell is doing that, but it's still a few years away."

Novell claims it met 1993 revenue expectations for NetWare 4. In a recent briefing, Richard King, executive vice president of Novell's NetWare Systems Group, said there are between 200 and 300 installations of the product.

But the company last week declined to provide details on sales and refused to comment on criticisms from analysts and resellers.

When NetWare 4.0 was released in March, users were excited and it showed. Revenue from the 3.X line fell to $155 million in the Novell's second quarter – down $26 million from the previous quarter – while NetWare 4.0 generated $40 million in revenue during that same quarter (see chart with revenue breakdown).

But revenue from NetWare 4 has been decreasing steadily and many analysts don't expect the product to meet revenue or sales expectations.

"Deployment has been much slower than I expected," said Michael Karfopoulos, an analyst at SoundView Financial Group, Inc. based in Stamford, Conn. "I expected to see about 500 sites using it by the end of '93, but I estimate there are less than 100 even now."

Others agreed. "I estimated that by the end of the fourth fiscal quarter of this year, 25% of Novell's revenue would come from NetWare 4.X. At this point, I'd lower that estimate to 15%," said one financial analyst who requested anonymity.

Reports from resellers reflect those figures.

"We've sold zero copies of NetWare 4.X," said Ravi Gulati, president of StonyBrook Technologies, Inc., a Novell Platinum reseller in Bohemia, N.Y.

Verner Tepe, a board member of the Local Area Networks Dealers Association (LANDA) and president of Universal Networks, Inc., a Novell Platinum reseller in Elmhurst, Ill., said, "We've only sold a couple of copies – less than half a dozen."

Tepe added that his company sells 10 to 20 copies of NetWare each month, "most all of which is 3.11 and 3.12."

Resellers say customers just don't need NetWare 4 – at least, not yet.

"NetWare 3.X was clearly for everybody. It was easy to do and made a lot of things possible" that weren't possible with NetWare 2.X, said Jon Freeman, president of Mycroft, a New York-based Platinum reseller. "Within the first year, we sold between 50 and 60 copies of NetWare 386 and stopped selling 2.X three months after 386 became available."

He added that Mycroft has only sold 10 copies of NetWare 4, and the company continues to sell 3.X.

However, most resellers and analysts insisted that the upgrade from 2.X to 3.X and from 3.X to 4.X is not an apples-to-apples comparison. Each move promised to take customers to the next level of network computing. But with NetWare 4, that step is a much larger one, representing a virtual paradigm shift in networking from the departmental to the enterprise level.

"When 386 came out, it was still a local decision -- a lot of folks could just put the package on their credit card," said Robert Sakakeeny, senior consultant at Aberdeen Group, Inc., a research and consulting firm in Boston. "NetWare 4 is a corporate purchase. The decision to move to 4.0 is made at a higher level."

Mycroft's Freeman agreed. "There's not a problem with the product – it's an issue of mindset," he said. "We have one customer that has 200 servers but just doesn't want to go through the migration."

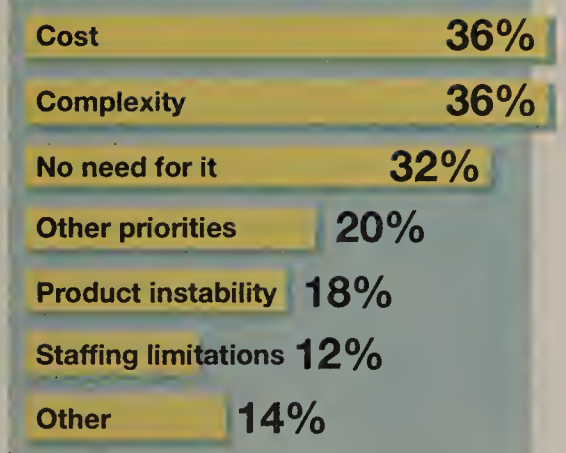
So what will come of NetWare 4?

"NetWare 4 will never be a successful product," Schatt said. "It will always be a high-end niche product and I don't think revenue from 4.X will ever surpass 3.X revenue."

But others, eyeing the May release of NetWare 4.1, are more optimistic.

"NeWare 4.1 will be a catalyst," said David Wu, computer analyst at SG Warburg, based in New York. "We passed on the first release but are interested in NetWare 4.1. People will absolutely go to NetWare 4, it's just a question of how fast."

Biggest barriers to installing NetWare 4
(Percentage of users responding)



Based on a survey of 50 network managers at large companies. More than one response was allowed.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

Novell's 1993 revenue breakdown
(In millions)

Product	1Q	2Q	3Q	4Q
NetWare 2.X	$6	$5	$6	$8
NetWare 3.X	$181	$155	$163	$176
NetWare 4.X		$40	$25	$20
Total NetWare	$187	$200	$194	$204
Interoperability products (for example, routers)	$39	$41	$38	$46
Unix System Laboratories, Inc.			$11	$27
UnixWare	$5.5	$-0.5	$3	$4
Total Unix	$5.5	$-0.5	$14	$31
Other	$28.5	$40.5	$27	$28
Total revenue	$260	$281	$273	$309

SOURCE: CS FIRST BOSTON, NEW YORK

DLSw patent squabble could stall standard

BY MICHAEL COONEY

IBM efforts to make its Data Link Switching (DLSw) routing technology a standard may run afoul over a patent issue that could render DLSw less than useful.

DLSw is IBM's technology for sending Systems Network Architecture and Network Basic I/O System traffic over Transmission Control Protocol/Internet Protocol backbones.

The latest round of debate centers on DLSw's adaptive pacing capabilities. Adaptive pacing lets routers and other devices implementing DLSw control the flow of data through the system and across the net to other devices.

The DLSw group has two options: they can fix the adaptive pacing specification at one set level or utilize IBM's technology, which would let a router automatically adjust the data flow according to traffic levels.

"Obviously, from a performance standpoint, the adaptive pacing IBM offers would make the device implementing DLSw faster and more flexible," said Robin Layland, principal consultant with Layland Consulting in West Hartford, Conn. Layland is also a member of the DLSw special interest group.

"The DLSw group has to go back to the drawing board and figure out what we want to do."

But IBM holds the patent on DLSw adaptive pacing technology and the DLSw group does not want to include patented technology in its standard.

If vendors are left to develop their own DLSw flow control methods, then the DLSw world will be populated with vendor-specific implementations, which defeats the purpose of DLSw being a standard for routing SNA and NETBIOS, analysts said.

"For IBM's part, it did try to get a waiver for the patent so we could include it, but that didn't work out," Layland said.

"What it means is the DLSw [special interest group] has to go back to the drawing board and figure out what we want to do," said Louis Herndon Wells, director of SNA internetworking at the Internet Technical Institute in Milpitas, Calif. Wells is the chairman of the DLSw group.

A decision could come from the next DLSw group meeting, which takes place this month at IBM's Advanced Peer-to-Peer Networking (APPN) Implementors Workshop.

Layland said a likely solution will be to set the pacing standard at the fixed level and offer the IBM patented pacing technology as an option. No one has indicated whether that will be acceptable though, he said.

For the vendors who have licensed IBM's APPN Network Node (NN) technology, such as CrossComm Corp., Wellfleet Communications, Inc. and Cisco Systems, Inc., the problem may be less severe. This is because the DLSw technology is included in the APPN NN license.

But observers say that without a standard, individual vendors could implement adaptive pacing differently, creating interoperability problems in the future.

"There are also other flow control methods we can and do implement, for example, to communicate with IBM's 6611 today," added Lori Dreher, senior product manager with Wellfleet. Dreher is also a member of the DLSw special interest group. "But if we implemented flow control as DLSw specifies now, we would only be able to talk to our own routers."

For instance, the routers were overtaxed by the state's LANs. Specifically, they ran out of room for data link connection identifiers, which serve as logical addresses on the frame relay network. Also, the routers' wide-area cards couldn't support enough IPX addresses in the buffer stacks, Fairless said.

"They just hadn't hit upon....that large of an implementation," Fairless said. "We happened to luck out and be the first."

To solve the identifier problem, Ascom Timeplex reworked its router operating system to provide more memory. To fix the wide-area cards, the manufacturer bumped up the queue depth.

The state's frame relay carrier, US West, Inc., also had problems with its equipment mistranslating the identifiers, resulting in permanent virtual circuits pointing in the wrong direction.

For the most part though, Utah's difficulties with US West centered on service issues rather than technical ones, Fairless said.

"A lot of it's been pushing their infrastructure -- people and facilities -- more than it's been the actual switching issues," Fairless said. In particular, the state has had to iron out contract details such as network response time and push to get T-1s installed and tested, he said.

Aside from the router and carrier difficulties, one of the toughest network problems proved to be an inside job.

In designing the network, Fairless and Leary worked with the individual agencies to determine what applications and protocols would need to be supported. After a number of agencies were brought on-line, the network was hit by barrages of hundreds of thousands of messages that jammed the network and caused a series of crashes.

The problem turned out to be that some users -- unbeknownst to their local net managers -- were running Network Basic I/O System on agency LANs. When it hit the frame relay network, NETBIOS, a nonroutable protocol, flooded the network with messages. Fairless and Leary solved the problem by blocking transmission of the protocol, and now keep an eye out for rogue protocols.

"Even though we've tried to watch out for them....we've gotten burned a couple times," Fairless said.

Down the road, Utah may want to shift to Synchronous Optical Network and Asynchronous Transfer Mode for transport, Fairless said. Even with that switch, the state could move to the new platform without swapping out its frame relay equipment, he said.

"Our end goal is to have one network that supports voice, video and data throughout the state to provide public access to schools and state and local governments," Fairless said.

Comments?

See "Contacts" box on page 2.

IBDN

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